

**HAFLEY Dan**

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**From:** Field, Jennifer A <jennifer.field@oregonstate.edu>  
**Sent:** Sunday, December 31, 2017 10:40 AM  
**To:** HAFLEY Dan  
**Subject:** RE: PDX Fire Training Areas investigation

Dan, I took a quick look at the areas indicated in your email. I have to admit that I don't track screening values so I don't have any comments there. I looked at the QA/QC and the data seems to meet their criteria. I noted the equipment blank was above their reporting limit (not sure how high above the reporting limit), suggests that protocols should be examined (depends on pump used and things like whether they have dedicated tubing). The TOP assay was interesting since the analysis by Test America reveals that the 6:2 fluorotelomer sulfonate (160,000 ng/L) concentrations in MW-4 exceed that of PFOS (92,000 ng/L). The 6:2 FTSA indicates that AFFFs made by telomer manufacturers were used at the site, like Ansul. The FTSAs are oxidizable by the TOP assay and you see that in the <LOQ (5,000 ng/L which is a really high reporting limit). The FTSAs convert to PFCAs and may explain the increase in the C4-C6, C7 PFCAs (looks like a normal dataset for the TOP assay for groundwater). It would appear from the TOP assay that not much in the groundwater converts to PFOA.

As for recommendations for analytical work:

1. It would be interesting to know what the TOP assay on soil and sediment gives (probably higher than groundwater and likely skewed toward longer chain precursors/PFAs/PFSAs).
2. Also, ask Vista to report % branched and linear for PFCAs and PFSAs (helps with interpretation) - skew toward linear indicates input by fluorotelomers (100% linear precursors)
3. Be sure to include FTSAs in future analyses (Test American can do this, maybe Vista can too) since equal or greater than PFOS (have seen this before), other telomer precursors/intermediates likely out there (may be on soil/sediment).
4. TOP assay indicates other precursors but not their identity so LC-quadrupole time of flight would reveal identity in groundwater and soil/sediment

Those are a few of the most obvious thoughts I had. I did have a hard time figuring out the screened interval on the MW wells - the table I saw only had groundwater elevations.

Happy New Year!

Jennifer

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**From:** HAFLEY Dan [Dan.HAFLEY@state.or.us]  
**Sent:** Thursday, December 28, 2017 12:57 PM  
**To:** Field, Jennifer A  
**Subject:** RE: PDX Fire Training Areas investigation

Thank you!

I believe you already have access, but in case not here is a link to the document on our "Webdocs" site: <http://www.deq.state.or.us/Webdocs/Forms/Output/FPCController.ashx?SourceIdType=11&SourceId=3324&Screen=Load>

The report is titled "Phase II Investigation Report" and dated December 13, 2017.

I think one of the more interesting "angles" to the PDX work is going to be contaminant migration to surface water, notably Columbia Slough. In addition to the PDX fire training areas, there is a former fire training pit located on the Air National Guard property, adjacent to a segment of Columbia Slough named "McBride Slough" and slated for cleanup in 2018. To my knowledge, there has been no testing of McBride Slough sediment for PFAS. There has been testing near



where PDX stormwater discharges to Columbia Slough, with at least one detection of PFOA/PFAS. Investigation of the slough on a large scale would be an interesting study.

DH

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**From:** Field, Jennifer A [mailto:jennifer.field@oregonstate.edu]  
**Sent:** Thursday, December 28, 2017 12:49 PM  
**To:** HAFLEY Dan <Dan.HAFLEY@state.or.us>  
**Subject:** RE: PDX Fire Training Areas investigation

Dan, I would be happy to take a look at your document and provide comments.  
Jennifer

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**From:** HAFLEY Dan [mailto:Dan.HAFLEY@state.or.us]  
**Sent:** Thursday, December 28, 2017 12:38 PM  
**To:** Field, Jennifer A  
**Subject:** PDX Fire Training Areas investigation

Jennifer –

DEQ is well into review of the Apex *Original and Former Fire Training Facilities, Investigation Results Report* prepared for the Port of Portland. We will be preparing comments on the report, but acknowledge that the results represent a second round of screening-level investigation. We will meet with the Port in January to discuss next steps, including both additional “delineation” work and installation of monitoring wells to start generating higher quality groundwater data.

To the extent that you have comments/thoughts on the report, we would be happy to receive them and consider prior to finalizing our feedback to the Port. Feedback on the following would be of particular interest:

- survey of regulatory screening values presented in Appendix A;
- data QA/QC discussion in Appendix D;
- results of TOP assay analysis, and conclusion that detected PFAS compounds are unlikely to “weather to substances of concern such as PFOA” (Section 4.4.5 and Appendix D);
- recommendation for analytical work in the next phase of investigation.

If you have time, feedback before mid-January would be helpful.

Thanks.

Daniel J. Hafley, RG  
Senior Project Manager / Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ







3015 SW First Avenue  
Portland, Oregon 97201-4707  
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## TRANSMITTAL MEMORANDUM

<b>Date:</b> December 18, 2017	<b>Project Number:</b> 1264-02
<b>Subject:</b> Original and Former Fire Training Facilities, Investigation Results Report Portland International Airport, Portland, Oregon, ECSI No. 3324	

**To:** Port of Portland  
Attn: Stan Jones  
7200 NE Airport Way  
Portland, Oregon 97218

<b>WE ARE SENDING YOU:</b> <input checked="" type="checkbox"/> Attached or <input type="checkbox"/> Under Separate Cover:			
<input checked="" type="checkbox"/> Report	<input type="checkbox"/> Letter	<input type="checkbox"/> Plans	<input type="checkbox"/> Specifications
<input type="checkbox"/> Proposal	<input type="checkbox"/> Contract	<input type="checkbox"/> Samples	<input type="checkbox"/> Other

<b>THESE ARE TRANSMITTED AS CHECKED BELOW:</b>			
<input type="checkbox"/> As Requested	<input checked="" type="checkbox"/> For Your Use	<input type="checkbox"/> For Review and Comment	<input type="checkbox"/> For Approval

Copies	Date	Description
3	12/13/2017	Original and Former Fire Training Facilities, Investigation Results Report Portland International Airport, Portland, Oregon, ECSI No. 3324

### Remarks:

Enclosed, please find 3 hard copies with attached CDs of the above-referenced report. Please feel free to contact me if you have any questions. Thank you.

Adam Reese, C.E.G.  
Senior Associate Engineering Geologist

**cc:** Dan Hafley, DEQ (3 hard copies with CD copies)

DEPT OF ENVIRONMENTAL QUALITY RECEIVED
DEC 19 2017
NORTHWEST REGION



3324  
3324  
COMM

HAFLEY Dan


**From:** Adam Reese <AReese@apexcos.com>  
**Sent:** Wednesday, December 13, 2017 4:51 PM  
**To:** HAFLEY Dan  
**Cc:** Stanton Jones; Jacobs, Teresa; Read, Daniel; Herb Clough; Ashleigh Fines  
**Subject:** PDX Original and Former Fire Training Facilities Investigation Results Report


Dan,

Good afternoon. On behalf of the Port of Portland, please find the *Original and Former Fire Training Facilities Investigation Results Report* accessible via [THIS LINK](#). If you have any difficulties opening the link, please let me know. We are sending you 3 hard copies in the mail. Please let us know if you have any questions or comments.

Thanks,

Adam



**Adam Reese**, R.G., C.E.G.  
Division Manager  
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**VIA UPS OVERNIGHT**

December 13, 2017

Direct Line: (503) 415-6351

Facsimile: (503) 548-5961

Email: [Matt.Hoffman@portofportland.com](mailto:Matt.Hoffman@portofportland.com)

Oregon Air National Guard  
Attn: Colonel Duke Pirak, Wing Commander  
142d Fighter Wing  
6801 NE Cornfoot Road  
Portland, OR 97218-5000

**Re: Update Regarding Oregon Department of Environmental Quality's Site Cleanup  
Claim Regarding Fire Training Areas at the Portland International Airport,  
Portland, Oregon (PDX)**

Dear Colonel Pirak:

This letter is intended to serve as an update regarding the Port of Portland's (Port) investigation of potential contamination at ESCI Site # 3324 (the Site) and a response to the Oregon Air National Guard's (OANG) request for a copy of the Port's August 3, 2017 *Preliminary Assessment, Aqueous Film-Forming Foam Use, Portland International Airport, Portland, Oregon*. This letter also renews the Port's request that the OANG participate in a comprehensive assessment and investigation of contaminants associated with OANG's current and historical fire training activities and use of firefighting chemicals at Portland International Airport (PDX).

As the Port explained in its October 17, 2016 notice and tender letter to the OANG, the Oregon Department of Environmental Quality (DEQ) informed the Port in September 2016 that it suspected contamination at "all historic[al] and current fire training areas on [PDX] property." Specifically, DEQ requested investigation and cleanup of contaminants likely connected to use of fire training areas, such as hydrocarbons, BTEX, and perfluorinated compounds (PFCs). Pursuant to DEQ's recommendation, the Port enrolled in DEQ's Voluntary Cleanup Program (VCP) in February 2017 to investigate current and historical fire training areas identified at the Site. Exhibit A (Voluntary Cleanup Agreement).



The Port conducted reconnaissance well sampling in the vicinity of its historical and current fire training facilities (the Site) in April 2017 according to the terms of the VCP. Sampling results showed elevated concentrations of PFOS and PFOA in shallow groundwater. Exhibit B (Reconnaissance Well Test Report). Under DEQ oversight, the Port has developed a work plan to further investigate the extent of contamination at the Site. Exhibit C (Work Plan). The Port is currently implementing this work plan and expects to submit a report documenting the work to the DEQ in December, 2017. The Port will share its sampling reports with the Guard.

In addition to these investigation activities, the Port has also conducted a Preliminary Assessment at PDX. Exhibit D (Preliminary Assessment). This Preliminary Assessment describes the history of operations at the Site and identifies additional Areas of Concern that may require investigation in the future. Because OANG has leased property at PDX since 1949, with various lease boundaries over time, several Areas of Concern identified in the Port's Preliminary Assessment relate to OANG's historical use of fire-fighting foam, including:

- OANG's current leasehold and historical fire training facility. The Port is aware that the OANG is investigating contamination associated with the use AFFF within its current leasehold at PDX and is cooperatively working with DEQ. The Port also learned at the September 6, 2017 kickoff meeting for that project that OANG intends to expand its scope of work to include the Guard's historical fire training facility (ERP Site #7). The Port appreciates this flexibility and willingness to conduct a thorough assessment of OANG's historical operations.
- OANG's historical fire station, located in the vicinity of the current UPS, west of the PDX Ground Run-Up Enclosure (GRE). The Port understands that OANG's current investigation does not include the historical fire station. Based on discussion at the September 6, 2017 kickoff meeting, however, the Port also understands that the Guard is researching whether funds may be available to investigate this site through the Formerly Used Defense Sites program.
- Port's fire training facility. OANG's fire department has utilized the Port's fire training facility since approximately the late 1970s for training activities. As explained above, the Port is currently engaged in investigation of this area and understands that OANG has not conducted and does not have plans to conduct any investigation in this area.

The OANG's current ground lease (Agreement No. 2013-001) holds the OANG as responsible "for any Hazardous Substance Release whether known or unknown or whether specifically identified under any audit, on the Leased Premises, on formerly leased properties or on other properties, in the air or in adjacent or nearby waterways (including groundwater), including residual contamination." Section 9.10. Under section 9.10 of the lease, the OANG is required to "diligently pursue regulatory closure." *See also* Sections 9.11 and 9.13.

To ensure compliance with agreement provisions cited above, this letter again tenders DEQ's claim to OANG for the investigation and, if necessary, remediation of any current and former OANG fire training areas at PDX. This letter also notifies OANG, pursuant to Ground Lease



Section 9.15, that the Port will be seeking reimbursement for OANG's portion of any investigation and cleanup costs associated with Port fire training areas jointly used by the Port and the OANG.

After you have had an opportunity to review this letter and share with other interested parties at your organization, the Port would like to host a meeting to confirm and discuss the following: (a) confirm OANG's plans to investigate contamination associated with use of AFFF at its current leasehold and at its historical fire training facility in February/March 2018; (b) confirm that OANG will share sampling results from its investigations with the Port and DEQ when they are available; (c) discuss the availability of funding to investigate OANG's historical fire station; and (d) discuss calculation of OANG's portion of investigation and, if necessary, cleanup costs associated with Port fire training areas jointly used by the Port and the OANG. Please let us know your availability for this meeting at your earliest convenience.

Very truly yours,



Matthew J. Hoffman, A.A.E.  
Sr. Manager, Aviation Commercial Properties

Encs:            Voluntary Cleanup Agreement (Exhibit A)  
                    Reconnaissance Well Sampling Results (Exhibit B)  
                    Work Plan (Exhibit C)  
                    Preliminary Assessment (Exhibit D)

cc w/encs:      National Guard Bureau, Andrews AFB (U.S. Mail)  
                    Stan Jones, Port of Portland (email)  
                    Daniel Read, Port of Portland (email)  
                    Col. Jenifer Pardy, 142 MSG Commander (email)  
                    Teresa Jacobs, Port of Portland (email)  
                    Kaitlyn Duncan, Port of Portland (email)  
                    Roger Rein, United States, 142 MSG/Environmental Manager (email)  
                    Dan Hafley, Oregon Department of Environmental Quality (email)



3324  
COMM

**HAFLEY Dan**

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**From:** HAFLEY Dan  
**Sent:** Tuesday, November 21, 2017 4:09 PM  
**To:** SEIDEL Paul; DECONCINI Nina  
**Cc:** GLEIM Laura  
**Subject:** Pending Port outreach to media - perfluorinated compound detections at PDX  
  
**Importance:** High

Paul and Nina –

As you may know, DEQ has been working with the Port of Portland on investigation of perfluorinated compounds (PFCs) at the Portland Airport. Releases of this emerging contaminant are associated with use of fire-fighting foams at PDX, largely for FAA-required fire training activities. The foams contain compounds including PFOA and PFOS which were the subject of a recent EPA drinking water health advisory. The Port has been working cooperatively with DEQ (me) in trying to determine whether these contaminants are present in soil and groundwater. PFCs are receiving much more attention these days, being both highly toxic and environmentally persistent, including within DEQ. While DEQ does not have promulgated standards in place, the EPA drinking water health advisory value is 70 ppt for combined PFOA and PFOS.

PFCs have been detected both soil and groundwater at PDX, but the extent appears to be localized and there is no known threat to drinking water aquifers including those tapped by the (nearby) Columbia South Shore Wellfield or local surface water. I just received word from my Port contact (Stan Jones) that their communications/outreach staff are going to meet with representatives from the Portland Tribune in the coming days to discuss their efforts to “get ahead of the issue”, and that an article may come out in the next week or two. They will be mentioning working with DEQ, and of course this may lead to direct media inquiries to the agency.

I will be asking the Port to keep up apprised of their outreach efforts and timing related to any newspaper articles. Nothing is expected to occur this week, and I will provide an update next week when folks are back in the office.

Please let me know if you have questions or comments.

Daniel J. Hafley, RG  
Senior Project Manager / Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ



**DEQ**

State of Oregon  
Department of  
Environmental  
Quality



**HAFLEY Dan**

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**From:** HAFLEY Dan  
**Sent:** Thursday, November 02, 2017 12:03 PM  
**To:** 'Jones, Stan'  
**Cc:** PETERSON Jenn L; POULSEN Mike  
**Subject:** RE: Confidential: PDX - Fire Training Facilities - Soil Sample Analysis Path Forward

Stan –

Thank you for the soil data. We are comfortable with your proposal to forego additional analysis of soil samples for PFC analysis, although we may have a slightly different “take” on the potential for these compounds to be present in soil. They are highly persistent and mobile as you have indicated, but do exhibit a tendency to bind to organic material. Depending on the soil type, there might be more (or less) accumulation of PFOS and PFOA associated with surface releases. The generated data indicate that PFOS and PFOA are present in soil; the next step from a soil sampling standpoint would be focusing on fire training “source” sampling as you have proposed. Depending on the results of this work, more wide-spread (exposure unit-based) sampling may be necessary where use of an alternative sampling methodology such as ISM could be considered.

Now that soil data are available, we should also start thinking about screening values that might be applicable for human and ecological receptors. ANG has proposed the use of (human health) soil screening values for PFOS and PFOA derived from the EPA Regional Screening Level protocol, which they identified as 1.26 mg/kg for both compounds. [ANG detections are present to a maximum of 0.20 mg/kg]. I have asked our toxicology team to “vet” the proposed ANG screening values, and you should perhaps look at them as well. We will also be checking into whether screening values for terrestrial and aquatic eco receptors are available within the regulatory universe.

Let me know if you have questions or comments.

Dan Hafley

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**From:** Jones, Stan  
**Sent:** Wednesday, November 01, 2017 3:20 PM  
**To:** Jones, Stan <[Stan.Jones@portofportland.com](mailto:Stan.Jones@portofportland.com)>  
**Cc:** Jacobs, Teresa <[Teresa.Jacobs@portofportland.com](mailto:Teresa.Jacobs@portofportland.com)>; Adam Reese ([AReese@apexc.com](mailto:AReese@apexc.com)) <[AReese@apexc.com](mailto:AReese@apexc.com)>; Herb Clough ([HClough@apexc.com](mailto:HClough@apexc.com)) <[HClough@apexc.com](mailto:HClough@apexc.com)>; Read, Daniel <[Daniel.Read@portofportland.com](mailto:Daniel.Read@portofportland.com)>  
**Subject:** FW: Confidential: PDX - Fire Training Facilities - Soil Sample Analysis Path Forward

Dan,

Attached is a plan showing the soil samples analyzed from the fire training areas. At this point we are not recommending running additional soil samples from this investigation. We do, however, recommend as part of upcoming work, additional focused soil sampling at the Fire Training Facilities in areas that would have the highest likelihood of being source areas based on the following reasoning.

The general model for PFAS release and migration at PDX is as follows: Most releases of PFAS at PDX would be related to releases of foam during training/response events or application of waters from training. There are no documented releases of AFFF concentrate in the Fire Training Areas, but concentrate tanks are sometimes staged at the training area for use during training, and concentrate storage tanks are part of some firefighting equipment, so it is possible that undocumented releases could have occurred in the past. If so, releases would have most likely occurred in the



immediate vicinity of the training areas. Because PFAS are relatively mobile in the environment, when released there is a tendency to move relatively quickly to groundwater and subsequently to move with groundwater – there is not a tendency for PFAS to accumulate in soil. Although in areas of prolonged fire training use, concentrations of PFAS in soil may be elevated but it is more likely that PFAS soil source areas would be associated with releases of AFFF concentrate to the ground surface.

Based on this model, several soil samples were analyzed in areas of higher groundwater concentrations to assess for soil sources. Consistent with the model above, the soil concentrations were not indicative of soil sources (concentrations were slightly above leaching to groundwater screening levels, but these were not suggestive of source areas amenable to remediation). Based on these results, and the fact that most soil samples collected are well outside likely source areas, we do not recommend additional analysis of soil samples collected during this phase of investigation. We do recommend that focused surface soil samples be collected at/near the Fire Training Areas to further assess for potential soil source areas as part of upcoming work.

Please let us know if you concur with these recommendations or if additional information is required.

Stan



**HAFLEY Dan**

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**From:** HAFLEY Dan  
**Sent:** Wednesday, November 01, 2017 10:42 AM  
**To:** Stan.Jones@portofportland.com  
**Subject:** PFC data, PDX fire training areas  
**Attachments:** 20171101100813357.pdf

Stan –

I spent a little time looking at the new groundwater and stormwater data related to the former fire training areas at PDX, including a quick breakdown of the groundwater data. In the attached figure, I color-coded the PFOS+PFOA analytical results to get a sense of contaminant distribution/isoconcentration contours. The data are segregated based on exceedance quotients (<1x, 1-10x, 10-100x, and >100x) using the 70 ng/L EPA HA level, and contour quite well. As Adam will no doubt be discussing in the forthcoming report, there is excellent delineation to the northwest and southeast of the old fire training areas, with additional delineation necessary, in particular, to the west/southwest. The “core” of the impact area seems to be pretty well defined, suggesting the main source in the old training areas and a secondary source near the current fire station. For planning purposes, the figure I prepared includes blue-highlighted areas where more data would be helpful for delineation. Given that these compounds are heavier than water, I think we need to be careful in future work to make sure that the vertical component is adequately addressed.

Re stormwater, the “up-pipe” detection at MH-2 seems consistent with the detection of PFCs in groundwater south of the current fire station. An obvious solution to the apparent infiltration of groundwater into the stormwater system in the former fire training areas would be either slip-lining or replacement of the leaking pipe sections, something that I’m guessing will not happen this year.

Looking forward to the report and happy to discuss as needed.

DH



# PFAS: Local Stakeholder Discussion

Tuesday, October 24, 2017, 09:00- 11:00, Port of Portland Offices

Purpose: Share information about PFAS regulation, investigation and public outreach.

*water quality group*

Attendees: <sup>Minister</sup>Loan Bourdon, <sup>fire protection</sup>Doug Wise, Scott Broadway – City of Portland Water Bureau  
 Dan Hafley – Oregon Department of Environmental Quality  
 Roger Rein – Oregon Air National Guard  
 Adam Reece - APEX  
 Stan Jones, Emerald Bogue, Teresa Jacobs – Port of Portland ✓

- Introductions (15 Min)
- Public Outreach and Discussion – Do we have a consistent message? Port/DEQ/City/ORANG (45 Min)
- Regulatory Framework of PFAS (15 Min)
  1. EPA Drinking Water Health Advisory (PFOS+PFOA = 70ppt)
  2. Development of Accepted Screening levels for: Groundwater/Sediment/ Soil/Surface Water
  3. Available Screening Levels and Risk Levels form other States/Countries
  4. Update Regarding DEQ's Plans for Regulation
- City Well Field Testing for PFAS (15 Min)
  1. Sampling to Date
  2. Planned Future Monitoring
  3. PA planned for Well Field?
- ORANG Base-Wide Preliminary Assessment and Upcoming Investigation Overview (15 Min)
- Port of Portland PDX Fire Training Area Investigation and PA (15 Min)



TPAS Mty  
Port of Portland / City Water 10/24/17  
ORWA / DEQ  
Name Contact Info

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# Air Force Civil Engineer Center

## FACT SHEET PFOS/PFOA

As of 7 November 2016

### Background – What are PFOS and PFOA?

Perfluorooctanesulfonic acid, PFOS, and perfluorooctanoic acid, PFOA, are synthetic fluorinated organic compounds used in many industrial and consumer products such as nonstick cookware, stain-resistant fabric and carpet, some food packaging and specialized foam.

Commonly grouped with other synthetic fluorinated chemicals using the umbrella term Perfluorinated Compounds — or PFCs — PFOS and PFOA are the only two compounds with established health advisories for drinking water.

- ❖ In 1970, the Air Force began using the firefighting agent Aqueous Film Forming Foam, or AFFF, which contains both PFOS and PFOA.
- ❖ AFFF is the most efficient extinguishing method for petroleum-based fires and is widely used across the firefighting industry, to include all commercial airports, to protect people and property.
- ❖ On May 19, 2016, the Environmental Protection Agency established lifetime health advisory levels of 70 parts per trillion for PFOS and PFOA in drinking water. Both compounds are classified as emerging contaminants due to evolving regulatory standards.

### AFFF Replacement

The Air Force began replacing legacy AFFF with a new, environmentally responsible firefighting foam in August 2016. The replacement foam, Phos-Chek 3 percent, six carbon chain AFFF is PFOS-free and contains only trace amounts of PFOA.

- ❖ The Air Force will complete legacy AFFF replacement in fire trucks by 2017, excluding four remote installations that will be complete, weather permitting, in spring 2017.
- ❖ The Air Force is no longer using AFFF (new or legacy) for firefighting training, and will continue to test the new C6 AFFF before incorporating it into training procedures. Under current Air Force policy, AFFF will be used only in emergency/life-saving circumstances.
- ❖ The Air Force is retrofitting 806 fire trucks with an Eco-Logic system that bypasses the tank containing AFFF and, instead, flows water through the extinguishing system and the cart, gathering data readings and discharging water from the vehicle's turret. Retrofitting will be complete by January 2018.



## AF Action – Identify » Respond » Prevent

The Air Force is working with the EPA, as well as state and local regulators, to address potential PFOS/PFOA contamination at active, Reserve, Air National Guard and closed Air Force installations. The Air Force's three-step approach systematically identifies, responds, and prevents potential PFOS/PFOA drinking water contamination related to the service's use of firefighting foam. The following chart outlines Air Force actions.

**Air Force Response Chart**

IDENTIFY	RESPOND	PREVENT
<ul style="list-style-type: none"> <li>❖ The Air Force has identified approximately 200 installations where PFOS/PFOA-containing firefighting foam may have been released.</li> <li>❖ The Air Force is conducting enterprise-wide sampling of drinking water to ensure Airmen and supporting communities have access to safe drinking water.</li> <li>❖ The Air Force is sampling groundwater to determine whether releases may have occurred and if PFOS/PFOA are present in groundwater.</li> <li>❖ Groundwater/soil sampling at sites are based on probability of contamination, possible pathway for the contaminant to reach drinking water sources and proximity to groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>❖ If the Air Force identifies a drinking water source that could be contaminated, it will be tested.</li> <li>❖ When drinking water sample results indicate PFOS/PFOA levels exceed the EPA's health advisory, the Air Force determines an appropriate mitigation action such as, providing an alternate drinking water source, filtration system and/or providing bottled water.</li> <li>❖ When PFOS/PFOA are detectable but below the HA level in drinking water, the Air Force may conduct well monitoring as needed to track level changes and determine if further action is needed.</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Air Force is replacing legacy AFFF with a new firefighting foam agent, Phos-Chek 3 percent, (C6 AFFF) which contains only trace amounts of PFOA.</li> <li>❖ In July 2015, the Air Force directed all installations to stop training and testing the foam systems on all fire vehicles and only use foam for emergency response. Testing with the new foam will not commence until further tests are conducted and containment strategies are assessed.</li> <li>❖ The Air Force is retrofitting fire trucks with a system that supports environmentally responsible system tests.</li> </ul>



It approached by public.

- NOT currently regulated by DOE But Assessing on an Agency-Wide Basis.
- Aware of and using EPA's 70 ppt HA level for screening purpose.
- Primary focus on drinking water at the moment, but other exposure end point will be considered.
- A number of sites being looked at by cleanup program, including military (OMD + Air Guard) & private.
- How to handle PFAS being considered at management level.
- The Cleanup will "use" EPA HA Level of 70 ppt and is considering screening value for other media.
- If exceedances found, would recommend Action or refer to EPA



Regulation at a  
national level.

- A number of states have developed regulatory standards for PFAS, including MN and Alaska. Most drinking water but not all.
- AT Aug, Feds have proposed use of 70 ppt for SW + SW, and developed a soil (HH) value based on EPA RSLs
- D2Q Cleanup toxicology Group has begun to consider at my request.
- D2Q will consider work by other states. IRIS is maybe a bit down the road.
- D2Q primary concern for PDX and APL is Groundwater and Surface water / Sed (Columbia Slough)
- I am coordinating with others including Toxics reduction



## City of Portland

- status of City investigation of PFA3
  - UCMR & other testing
    - where
    - when
    - results
  - City Afff testing use in wellfield Area.
- 

## 2 Blended Samples

UCMR

## City of Portland contacts

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- Barb Adkins
- Rod Struck
- Stacy Hibbs



# MEETING NOTES

10/29/17

EMERALD public outreach  
- COLUMBIA Slough watershed  
council

- community advisory group  
will talk about fire station,  
and why they have it.

how the chemicals work,  
where it occurs. talk about  
VCP. what we know and  
what we don't



5207  
COMM

**HAFLEY Dan**

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**From:** SUTTER Jennifer  
**Sent:** Tuesday, October 24, 2017 12:45 PM  
**To:** HAFLEY Dan  
**Subject:** Fish tissue dioxin in the Slough

Dan

As we discussed, the City recently submitted their draft fish tissue sampling report for the Columbia Slough. This is part of their long-term monitoring in the Slough that occurs every 10 years and the most recent samples were collected in 2015. This year we added dioxin to the analyte list for a subset (10) of the samples collected. The fish sample with the highest dioxin concentrations in this event (dioxin TEQ of 4.86) was collected from the western end of the Middle Slough. PCBs were also elevated in this sample (356.44 ug/kg total aroclors, 178.2 total congeners). I believe there is a Port of Portland stormwater outfall at this location that drains portions of the airport and the Air National Guard site. Since these facilities may be sources of dioxin as a result of fire training facilities and associated burning of oils, the Slough fish tissue results likely warrant some follow-up sampling and potentially source control measures. The full fish tissue report can be found here <V:\Jennifer Sutter's Project Files\1283 - Columbia Slough\Long term monitoring\2015 Fish Tissue Sampling\Report\Columbia Slough Fish Tissue Report - 2015 Sampling.pdf> (See section 4.4.6 and Figure F-3) and the Data tables can be found here: [V:\Jennifer Sutter's Project Files\1283 - Columbia Slough\Long term monitoring\2015 Fish Tissue Sampling\Report\Appendix G 2015 Columbia SloughFishTissueData \(09-11-2017\).xlsx](V:\Jennifer Sutter's Project Files\1283 - Columbia Slough\Long term monitoring\2015 Fish Tissue Sampling\Report\Appendix G 2015 Columbia SloughFishTissueData (09-11-2017).xlsx)

Let me know if you need more information. Thanks!

Jennifer



3324  
com

---

**HAFLEY Dan**

**From:** Adam Reese <AReese@apexc.com>  
**Sent:** Wednesday, September 20, 2017 9:54 AM  
**To:** HAFLEY Dan; Ashleigh Fines  
**Cc:** Herb Clough; SUTTER Jennifer; Stanton Jones; Teresa Jacobs (teresa.jacobs@portofportland.com)  
**Subject:** RE: PDX Original and Former Fire Training Facilities Investigation Work Plan - Letter Amendment

Hi Dan,

Here's the schedule:

- Thursday 9/21 (1:00 PM) - Apex will be onsite to mark additional boring locations for soil/groundwater investigation.
- Tuesday 9/27 - Apex will be onsite to sample 4 monitoring wells in the Fire Training Facility vicinity.
- Wednesday 9/27 – Friday 9/29 - Second Phase of Direct Push soil and groundwater sampling
  - Thursday 9/28 - Outfall 1N Sediment Sampling
  - Friday 9/29 - Stormwater Conveyance System camera survey (Fire Training Facilities vicinity)
- Monday 10/2 - Deep Aquifer Sampling: Sonic drill rig

I'll let you know if anything changes.

Thanks,

Adam

	<p><b>Adam Reese</b>, R.G., C.E.G. Division Manager <b>Apex Companies, LLC</b> 3015 SW First Avenue Portland, OR 97201 O) 503-924-4704 x1902 M) 503-502-2726  Add me to your contact list!</p>
---	---

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---

**From:** HAFLEY Dan [mailto:dan.hafley@state.or.us]  
**Sent:** Wednesday, September 20, 2017 9:51 AM  
**To:** Ashleigh Fines <AFines@apexc.com>  
**Cc:** Adam Reese <AReese@apexc.com>; Herb Clough <HClough@apexc.com>; SUTTER Jennifer <jennifer.sutter@state.or.us>; Stanton Jones <Stan.Jones@portofportland.com>; Teresa Jacobs (teresa.jacobs@portofportland.com) <teresa.jacobs@portofportland.com>  
**Subject:** RE: PDX Original and Former Fire Training Facilities Investigation Work Plan - Letter Amendment





3015 SW First Avenue  
Portland, Oregon 97201-4707  
(503) 924-4704 Phone  
(503) 943-6357 Fax

## TRANSMITTAL MEMORANDUM

<b>Date:</b> September 5, 2017	<b>Project Number:</b> 1264-02
<b>Subject:</b> Investigation Work Plan, Original and Former Fire Training Facilities, Portland International Airport, Portland, Oregon, ECSI No. 3324	

**To:** Port of Portland  
Attn: Stan Jones  
7200 NE Airport Way  
Portland, Oregon 97218

DEPT OF ENVIRONMENTAL QUALITY  
RECEIVED  
  
SEP 08 2017  
  
NORTHWEST REGION

<b>WE ARE SENDING YOU:</b> <input checked="" type="checkbox"/> Attached    or <input type="checkbox"/> Under Separate Cover:			
<input checked="" type="checkbox"/> Report	<input type="checkbox"/> Letter	<input type="checkbox"/> Plans	<input type="checkbox"/> Specifications
<input type="checkbox"/> Proposal	<input type="checkbox"/> Contract	<input type="checkbox"/> Samples	<input type="checkbox"/> Other

<b>THESE ARE TRANSMITTED AS CHECKED BELOW:</b>			
<input type="checkbox"/> As Requested	<input checked="" type="checkbox"/> For Your Use	<input type="checkbox"/> For Review and Comment	<input type="checkbox"/> For Approval

Copies	Date	Description
5	8/29/2017	Investigation Work Plan, Original and Former Fire Training Facilities, Portland International Airport, Portland, Oregon, ECSI No. 3324

### Remarks:

Enclosed, please find 5 copies of the above-referenced report. Please feel free to contact me if you have any questions. Thank you.

Adam Reese, C.E.G.  
Senior Associate Engineering Geologist

**cc:** Dan Hafley, DEQ (2 hard copies with CD copies)



**HAFLEY Dan**

---

**From:** Adam Reese <AReese@apexc.com>  
**Sent:** Wednesday, August 30, 2017 8:55 AM  
**To:** HAFLEY Dan  
**Cc:** Stanton Jones; Jacobs, Teresa; Herb Clough; Ashleigh Fines  
**Subject:** RE: PDX Fire Training Facilities - Taxiway B explorations/sampling - Week of 8/28  
**Attachments:** 1264-02 03 (Sampling Locations) FINAL.PDF

Dan,

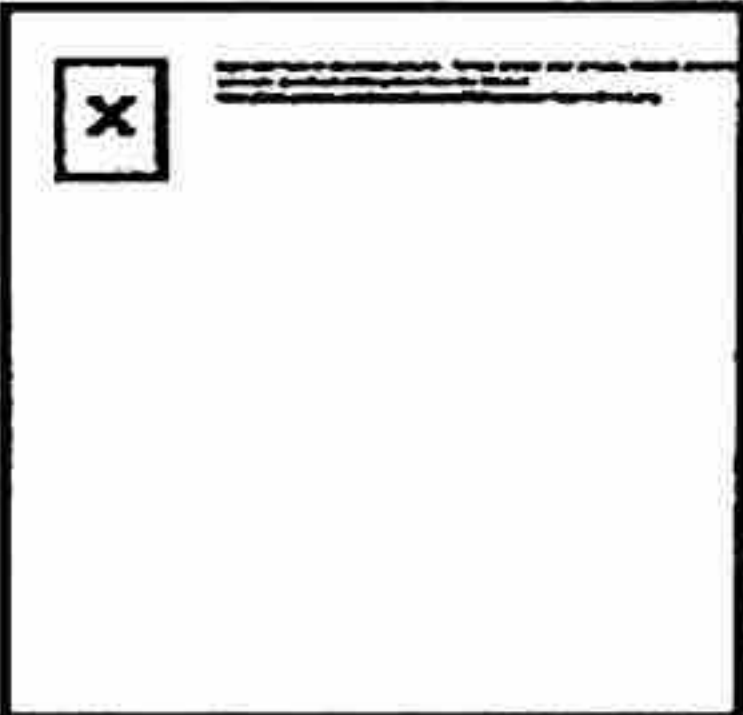
Good morning. Just following up on the email below to let you know that we completed 10 borings on Monday 8/28 and Tuesday 8/29, including those in the vicinity of Taxiway B (taking advantage of the temporary movement area closure). Locations completed included F, G, N, O, P, Q, R, S, T, and U (see attached figure). In addition, we collected 4 stormwater/surface water samples (MH-1, MH-2, SW-1, and OF-1N [Outfall 1N stormwater]). Sampling was conducted in general accordance with methods presented in the Work Plan.

The samples will be submitted to Vista analytical for PFAS analysis. Results are anticipated on or around September 22. The remaining direct explorations, monitoring well sampling, and sediment sampling will be conducted September 27-29. The deep exploration (location M) has not yet been scheduled.


Thank you very much for pre-approval of this round of sampling to take advantage of the Taxiway B closure. Please let us know if you have any questions or require additional information at this time.

Best,

Adam



**Adam Reese**, R.G., C.E.G.  
Division Manager  
**Apex Companies, LLC**  
3015 SW First Avenue  
Portland, OR 97201  
O) 503-924-4704 x1902 M) 503-502-2726

 Add me to your contact list!

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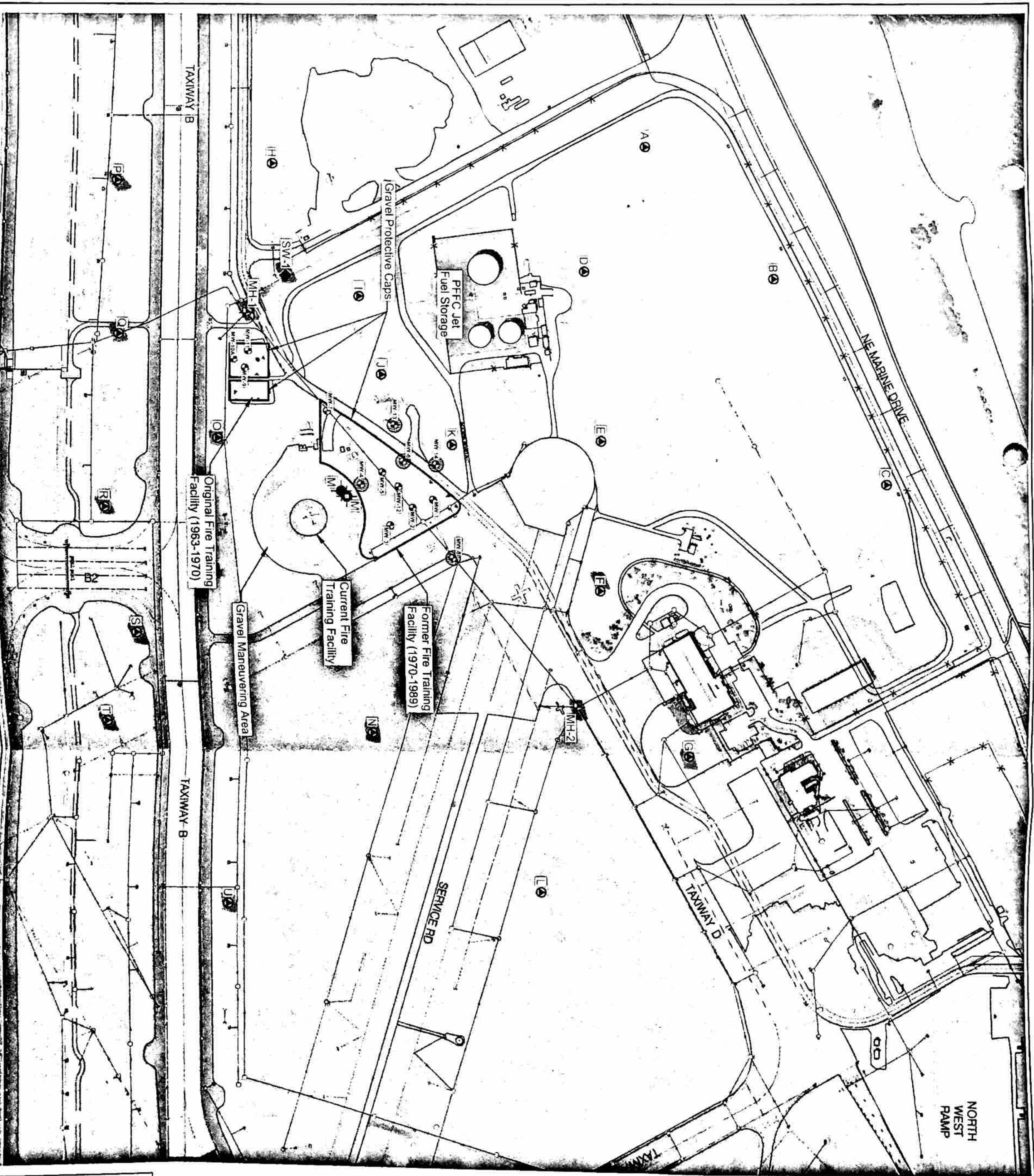
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---

**From:** Adam Reese  
**Sent:** Tuesday, August 22, 2017 6:11 PM  
**To:** 'HAFLEY Dan' <dan.hafley@state.or.us>  
**Cc:** 'Jones, Stan' <Stan.Jones@portofportland.com>; 'Jacobs, Teresa' <Teresa.Jacobs@portofportland.com>; Herb Clough <HClough@apexc.com>; Ashleigh Fines <AFines@apexc.com>  
**Subject:** PDX Fire Training Facilities - Taxiway B explorations/sampling - Week of 8/28  
**Importance:** High

Dan,





Legend:

- A ● Proposed Shallow Groundwater and Vadose Zone Soil Location
- M ● Proposed Deep Groundwater Location (~50' Overbank Deposits)
- M ● Co-located Proposed Deep Groundwater Location (~80' Columbia River Sand Aquifer)
- MH-1 ● Proposed Stormwater Sample Location (Manhole)
- SW-1 ◆ Proposed Surface Water Sample Location
- MW-11 ○ Monitoring Well Location
- Existing Wells to be Sampled
- Underground Storm Sewer Pipeline
- - - Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap



0 300 600

Scale in Feet

Note: Base map prepared from a 2013 Port of Portland AutoCAD base (pdx-features\_POP-LOCAL).

Proposed Sampling Locations  
Fire Training Facilities Investigation Work Plan  
Port of Portland  
Portland, Oregon

Apex Companies, LLC  
3015 SW First Avenue  
Portland, Oregon 97201

Project Number 1264-02  
August 2017

Figure 3

05-1N



**HAFLEY Dan**

---

**From:** HAFLEY Dan  
**Sent:** Tuesday, August 22, 2017 7:54 AM  
**To:** EMME DAVID H  
**Cc:** SEIDEL Paul  
**Subject:** FW: PFAS issue, PDX/Guard area

David –

I am forwarding an email sent to Todd Hudson last week, which contains background on investigation of PFAS in the vicinity of Portland International Airport. Take a look and let me know if you have questions. I would be happy to meet and discuss if you are still interested in doing so after your review. Otherwise we can keep you in the loop as investigation moves forward. Given the location of detected PFAS contamination west of the Portland Wellfield, we do not see a significant risk at the moment re drinking water, but will know more after additional characterization is completed. Note that the Port is in the process of figuring out when and how to roll out information to the public.

Respectfully,

*Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ*

---

**From:** HAFLEY Dan  
**Sent:** Tuesday, August 15, 2017 9:48 AM  
**To:** HUDSON TODD <todd.hudson@state.or.us>  
**Cc:** SIFUENTES Julie <julie.sifuentes@state.or.us>; SEIDEL Paul <SEIDEL.Paul@deq.state.or.us>  
**Subject:** PFAS issue, PDX/Guard area

Todd –

Thanks for your interest. Fluorinated contaminants including PFOS and PFOA have been detected in groundwater in the western portion of the airport property, associated with former fire-fighting training activities. To date, contamination has been detected in shallow groundwater in a localized area, and there is no known risk to either human or ecological receptors. The Port of Portland is working with DEQ under the Voluntary Cleanup Program, and in the process of drafting a work plan to better characterize the nature and extent of contamination. Separately, the Air National Guard has developed a work plan to assess potential releases of PFCs through historical storage and use of fire-fighting foams (so-called AFFF). Work will occur in 2018 and it seems likely that these contaminants will be detected. Investigation will occur on property occupied by ANG that is currently leased from the Port, and is part of a nationwide effort to assess PFC impacts at Guard facilities.

Investigation at both “sites” is being performed voluntarily with DEQ oversight. There is a bit of a regulatory limbo as screening and/or cleanup values have not been adopted to date by DEQ (at least with respect to the Cleanup Program). As you know, EPA has issued a Health Advisory for these contaminants, and a number of states are or will be developing regulatory standards. DEQ has convened a working group that has begun looking at the issue, and it seems likely that your agency will be engaged at some point.

As indicated above, existing data do not indicate a risk which might warrant OHA engagement. As more data are developed, it is possible that the situation might change and we will keep you in mind. Both the Port and ANG are



concerned about potential PFC release and has been proactive in trying to “get ahead of the issue”. We support their efforts.

Please let me know if you have questions or comments.

Respectfully,

Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ

---

**From:** HUDSON TODD  
**Sent:** Monday, August 14, 2017 11:49 AM  
**To:** HAFLEY Dan <[Dan.HAFLEY@state.or.us](mailto:Dan.HAFLEY@state.or.us)>  
**Subject:** FW: Follow-up

Hi Dan,

As Julie said, I’m available if there are health-related questions. At the moment, we’re watching this for now...I’m just currently watching to see who all the other players are (DEQ, Drinking Water Services, PDX Water Bureau, etc.) and what they’re doing.

**Todd Hudson**  
Public Health Toxicologist  
OREGON HEALTH AUTHORITY  
Public Health Division  
Office of Environmental Public Health  
[todd.hudson@dhsoba.state.or.us](mailto:todd.hudson@dhsoba.state.or.us)  
971-673-0024  
<http://public.health.oregon.gov/PHD/Directory/Pages/program.aspx?pid=64>

---

**From:** SIFUENTES Julie  
**Sent:** Friday, August 11, 2017 5:15 PM  
**To:** HAFLEY Dan <[Dan.HAFLEY@state.or.us](mailto:Dan.HAFLEY@state.or.us)>  
**Cc:** Farrer David G <[DAVID.G.FARRER@dhsoba.state.or.us](mailto:DAVID.G.FARRER@dhsoba.state.or.us)>; Hudson Todd <[TODD.HUDSON@dhsoba.state.or.us](mailto:TODD.HUDSON@dhsoba.state.or.us)>; Goldfarb Gabriela <[GABRIELA.G.GOLDFARB@dhsoba.state.or.us](mailto:GABRIELA.G.GOLDFARB@dhsoba.state.or.us)>; Emme David H <[DAVID.H.EMME@dhsoba.state.or.us](mailto:DAVID.H.EMME@dhsoba.state.or.us)>  
**Subject:** Follow-up

Hi Dan – Since we weren’t able to connect over the phone today, I thought I would follow up with an e-mail. There are a few of us at the Public Health Division interested in learning more about the sampling results near the Air National Guard base in Portland. Primarily, this is of interest to our Drinking Water Services group managed by David Emme, copied here.

The Environmental Health Assessment Program, which I manage, is interested in tracking this issue and is available for any toxicological or health risk questions. Our federal funder, the Agency for Toxic Substances and Disease Registry is



involved at a number of PFAS-related sites in the country and has been encouraging all of their state health partners to be paying attention to PFAS and PFOA related issues.

I am out of the office next week and wanted to make sure that you and David Emme are connected. I also have copied Todd Hudson and Dave Farrer, our toxicologists, who are the point of contacts for any health risk questions that might come up around this issue.

Warm Regards,

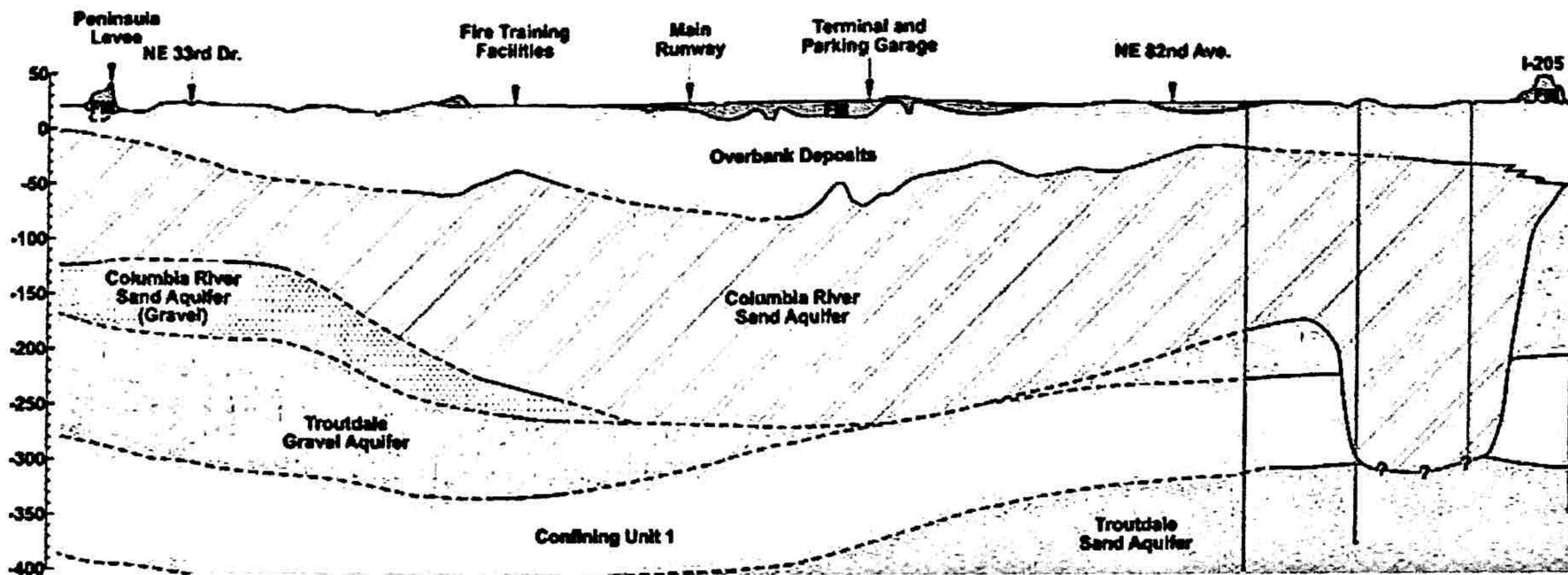
Julie

Julie Early Sifuentes  
Program Manager  
OREGON HEALTH AUTHORITY  
Public Health Division  
Environmental Public Health  
[Julie.Sifuentes@state.or.us](mailto:Julie.Sifuentes@state.or.us)  
Desk: 971-673-0438  
Cell: 503-269-3689  
<http://www.oregon.gov/OHA>



## HAFLEY Dan

From: Jones, Stan <Stan.Jones@portofportland.com>  
Sent: Wednesday, August 16, 2017 3:19 PM  
To: HAFLEY Dan (dan.hafley@state.or.us)  
Subject: DRAFT PDX X-Section



Dan,  
I had Adam (APEX) work on a cross-section of the geology of the training areas.  
I'm sharing this as a preliminary working DRAFT In Progress at this point and it is for your information only.  
Stan



## HAFLEY Dan

---

**From:** Jones, Stan <Stan.Jones@portofportland.com>  
**Sent:** Tuesday, August 15, 2017 1:08 PM  
**To:** HAFLEY Dan  
**Subject:** Re: PFAS issue, PDX/Guard area

Thanks Dan. Your response was right on.  
Stan

Sent from my iPhone

On Aug 15, 2017, at 09:49, HAFLEY Dan <[dan.hafley@state.or.us](mailto:dan.hafley@state.or.us)> wrote:

Stan –

FYI.

---

**From:** HAFLEY Dan  
**Sent:** Tuesday, August 15, 2017 9:48 AM  
**To:** HUDSON TODD <[todd.hudson@state.or.us](mailto:todd.hudson@state.or.us)>  
**Cc:** SIFUENTES Julie <[julie.sifuentes@state.or.us](mailto:julie.sifuentes@state.or.us)>; SEIDEL Paul <[SEIDEL.Paul@deq.state.or.us](mailto:SEIDEL.Paul@deq.state.or.us)>  
**Subject:** PFAS issue, PDX/Guard area

Todd –

Thanks for your interest. Fluorinated contaminants including PFOS and PFOA have been detected in groundwater in the western portion of the airport property, associated with former fire-fighting training activities. To date, contamination has been detected in shallow groundwater in a localized area, and there is no known risk to either human or ecological receptors. The Port of Portland is working with DEQ under the Voluntary Cleanup Program, and in the process of drafting a work plan to better characterize the nature and extent of contamination. Separately, the Air National Guard has developed a work plan to assess potential releases of PFCs through historical storage and use of fire-fighting foams (so-called AFFF). Work will occur in 2018 and it seems likely that these contaminants will be detected. Investigation will occur on property occupied by ANG that is currently leased from the Port, and is part of a nationwide effort to assess PFC impacts at Guard facilities.

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As indicated above, existing data do not indicate a risk which might warrant OHA engagement. As more data are developed, it is possible that the situation might change and we will keep you in mind. Both the Port and ANG are concerned about potential PFC releases and has been proactive in trying to “get ahead of the issue”. We support their efforts.

Please let me know if you have questions or comments.



Respectfully,

Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ

---

**From:** HUDSON TODD  
**Sent:** Monday, August 14, 2017 11:49 AM  
**To:** HAFLEY Dan <[Dan.HAFLEY@state.or.us](mailto:Dan.HAFLEY@state.or.us)>  
**Subject:** FW: Follow-up

Hi Dan,

As Julie said, I'm available if there are health-related questions. At the moment, we're watching this for now...I'm just currently watching to see who all the other players are (DEQ, Drinking Water Services, PDX Water Bureau, etc.) and what they're doing.

**Todd Hudson**  
Public Health Toxicologist  
OREGON HEALTH AUTHORITY  
Public Health Division  
Office of Environmental Public Health  
[todd.hudson@dhsosha.state.or.us](mailto:todd.hudson@dhsosha.state.or.us)  
971-673-0024  
<http://public.health.oregon.gov/PHD/Directory/Pages/program.aspx?pid=64>

---

**From:** SIFUENTES Julie  
**Sent:** Friday, August 11, 2017 5:15 PM  
**To:** HAFLEY Dan <[Dan.HAFLEY@state.or.us](mailto:Dan.HAFLEY@state.or.us)>  
**Cc:** Farrer David G <[DAVID.G.FARRER@dhsosha.state.or.us](mailto:DAVID.G.FARRER@dhsosha.state.or.us)>; Hudson Todd <[TODD.HUDSON@dhsosha.state.or.us](mailto:TODD.HUDSON@dhsosha.state.or.us)>; Goldfarb Gabriela <[GABRIELA.G.GOLDFARB@dhsosha.state.or.us](mailto:GABRIELA.G.GOLDFARB@dhsosha.state.or.us)>; Emme David H <[DAVID.H.EMME@dhsosha.state.or.us](mailto:DAVID.H.EMME@dhsosha.state.or.us)>  
**Subject:** Follow-up

Hi Dan – Since we weren't able to connect over the phone today, I thought I would follow up with an e-mail. There are a few of us at the Public Health Division interested in learning more about the sampling results near the Air National Guard base in Portland. Primarily, this is of interest to our Drinking Water Services group managed by David Emme, copied here.

The Environmental Health Assessment Program, which I manage, is interested in tracking this issue and is available for any toxicological or health risk questions. Our federal funder, the Agency for Toxic Substances and Disease Registry is involved at a number of PFAS-related sites in the country and has been encouraging all of their state health partners to be paying attention to PFAS and PFOA related issues.



## HAFLEY Dan

---

**From:** HAFLEY Dan  
**Sent:** Thursday, August 10, 2017 10:47 AM  
**To:** 'Jones, Stan'  
**Cc:** 'Adam Reese'  
**Subject:** RE: PDX Fire Training Area Proposed Sampling

Stan –

I have taken a look at the Proposed Sampling Locations figure and have a few comments/questions for our discussion at 1 pm.

- Proposed shallow groundwater and vadose soil sampling appears pretty robust, covering a fairly large area extending radially from the former and current fire training areas. We presume it was designed to provide general aerial coverage rather than specific sources. One question I have is what the shallow groundwater flow regime looks like in the sampling area. We know that shallow groundwater is being influenced by/drawn towards the sewer in its vicinity, but at some (unknown?) distance away from the sewer influence would cease and the natural gradient would take over. If contamination is detected in the water table aquifer outside of the fire training areas, we expect that wells will be needed to provide for multi-event contaminant monitoring, and elevation measurements to establish groundwater gradient maps.
- DEQ notes the proximity of the Current Fire Station to the fire training areas, and that two sample locations are in the general area of this feature. Are samples meant to either address this feature as a source or just provide general areal coverage? We presume the latter.
- Depending on the exact location of the Land Application Area north of the Original Fire Training Facility, you may want to consider adding an additional shallow location northwest of MW-7 to provide better general coverage of this area.
- It would be helpful to see work plan text discussing the reasoning behind the proposed Deeper OD and CRSA wells ("K" wells) location. Any reason that they were installed *outside* of the "original" and "former" fire training areas? There is also the question about groundwater flow direction in these deeper aquifers; DEQ wants to make sure that positioning of the deeper wells is appropriate relative to known or suspected source areas.
- Proposed initial sampling of stormwater at the MH-1 location is fine, however we expect that a more robust effort will be needed given contaminant detections in shallow groundwater and the likelihood that groundwater is infiltrating the local sewer. Assuming that water is infiltrating at present, it would seem to provide a good measure of contaminant load under "base flow" conditions. A larger question is whether the sewer is going to be slip-lined or otherwise isolated from shallow groundwater. If not, we would like to see an investigation effort that changing groundwater-storm sewer interaction over the course of the year. You may want to consider collection of an up-pipe sewer sample to assess "background" to the east.
- Resampling of existing wells does not include those where the highest concentrations of PFOS and PFOA were previously detected. Any need to resample during the proposed event to confirm contaminant conditions? If not: it seems likely that proposed investigation will lead to follow-up installation of monitoring wells. If and when that occurs, a monitoring regimen should be established that includes both existing and new wells.

DH



**From:** Jones, Stan [mailto:Stan.Jones@portofportland.com]  
**Sent:** Thursday, August 10, 2017 9:02 AM  
**To:** HAFLEY Dan (dan.hafley@state.or.us) <dan.hafley@state.or.us>  
**Subject:** PDX Fire Training Area Proposed Sampling

Dan,  
Our proposed sampling locations are shown on the attached plan. Please look it over and we can discuss at 1:00 today.

Stan





3015 SW First Avenue  
Portland, Oregon 97201-4707  
(503) 924-4704 Phone  
(503) 943-6357 Fax

## TRANSMITTAL MEMORANDUM

**Date:** August 4, 2017

**Project Number:** 2333-00

**Subject:** Preliminary Assessment, AFFF Use, Portland  
International Airport

**To:** Port of Portland  
Attn: Stan Jones  
7200 NE Airport Way  
Portland, Oregon 97218

<b>WE ARE SENDING YOU:</b> <input checked="" type="checkbox"/> Attached    or <input type="checkbox"/> Under Separate Cover:			
<input checked="" type="checkbox"/> Report	<input type="checkbox"/> Letter	<input type="checkbox"/> Plans	<input type="checkbox"/> Specifications
<input type="checkbox"/> Proposal	<input type="checkbox"/> Contract	<input type="checkbox"/> Samples	<input type="checkbox"/> Other

<b>THESE ARE TRANSMITTED AS CHECKED BELOW:</b>			
<input type="checkbox"/> As Requested	<input checked="" type="checkbox"/> For Your Use	<input type="checkbox"/> For Review and Comment	<input type="checkbox"/> For Approval

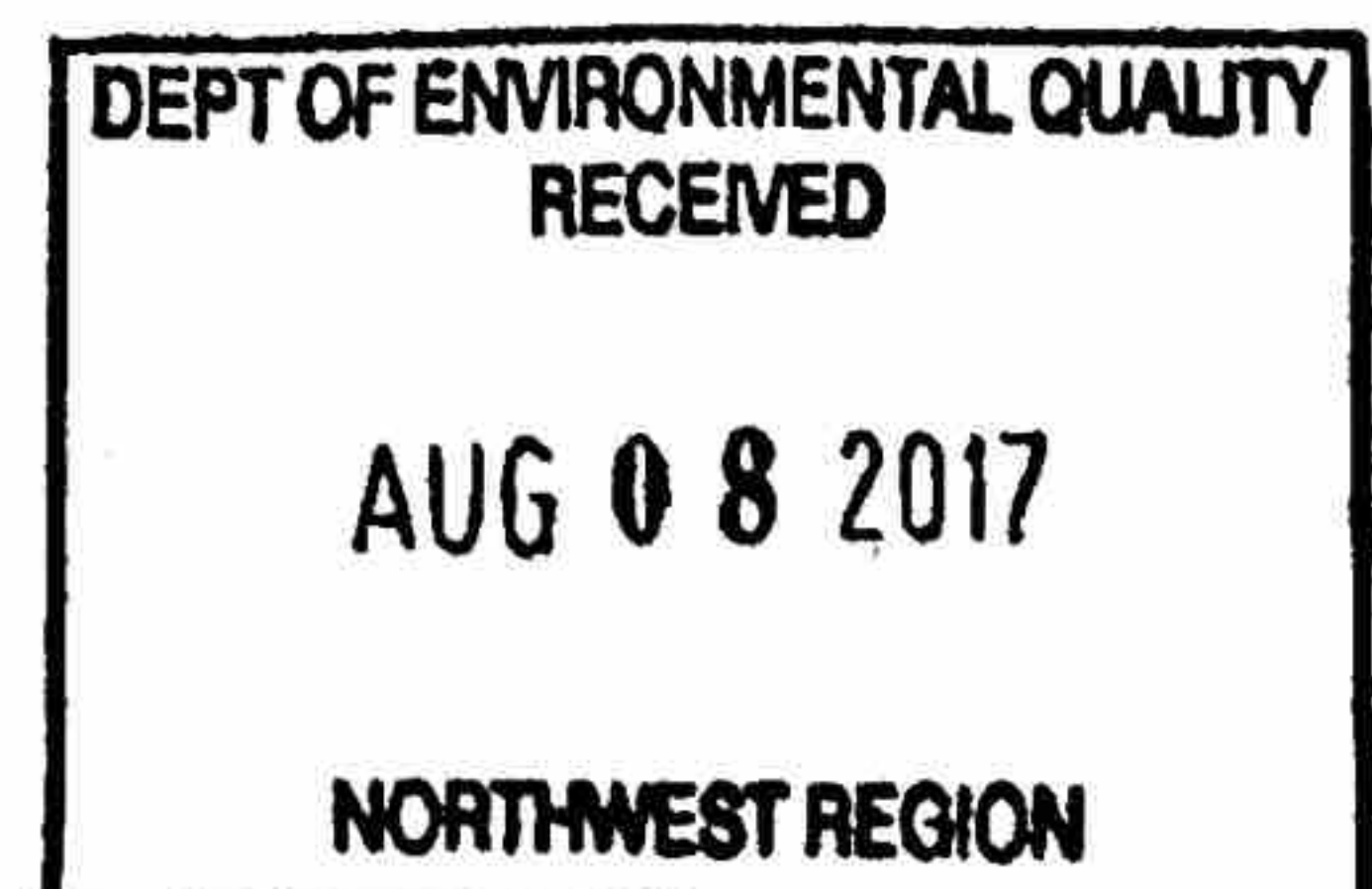
Copies	Date	Description
5	8/3/2017	Preliminary Assessment, Aqueous Film-Forming Foam Use, Portland International Airport, Portland, Oregon

**Remarks:**

Enclosed, please find 5 copies of the above-referenced report. Please feel free to contact me if you have any questions. Thank you.

Adam Reese, C.E.G.  
Senior Associate Engineering Geologist

**cc:** Dan Hafley, DEQ (2 hard copies, 1 CD copy)





COMM

**HAFLEY Dan**

---

**From:** HAFLEY Dan  
**Sent:** Friday, August 04, 2017 9:16 AM  
**To:** Rein, Roger C CIV USAF 142 MSG (US); 'Saunders, Frances D CIV USAF NGB A4 (US)'  
**Subject:** FW: Preliminary Assessment Report - PDX Aqueous Film-Forming Foam Use  
**Attachments:** Preliminary Assessment Aqueous Film-Forming Foam Use PDX 20170803.pdf

Roger and Fran –

Please note that DEQ has received the attached preliminary assessment from the Port of Portland outlining the storage, use, etc. of fire-fighting foams on Portland International Airport property. Based on the detection of PFOS, PFOA, and related compounds in groundwater at the former fire training pits on PIA property, plans are being developed by the Port for broader assessment under DEQ.

I can be reached at (503) 229-5417.

Dan Hafley

Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ

---

**From:** Adam Reese [mailto:AReese@apexcoss.com]  
**Sent:** Friday, August 04, 2017 8:42 AM  
**To:** HAFLEY Dan <HAFLEY.Dan@deq.state.or.us>  
**Cc:** Stanton Jones <Stan.Jones@portofportland.com>; Read, Daniel <Daniel.Read@portofportland.com>; Jacobs, Teresa <Teresa.Jacobs@portofportland.com>; Herb Clough <HClough@apexcoss.com>; Ashleigh Fines <AFines@apexcoss.com>  
**Subject:** Preliminary Assessment Report - PDX Aqueous Film-Forming Foam Use

Dan,

Good morning. On behalf of the Port of Portland, please find attached the Preliminary Assessment Report for Aqueous Film-Forming Foam Use at PDX. We are sending you 2 hard copies in the mail. Please let us know if you have any questions or comments.

Thanks,

Adam

 <b>APEX</b> apexcoss.com	<b>Adam Reese, R.G., C.E.G.</b> Division Manager
	<b>Apex Companies, LLC</b> 3015 SW First Avenue Portland, OR 97201
	O) 503-924-4704 x1902 M) 503-502-2726
	 Add me to your contact list!

Follow Apex on  and Like us on 



322  
**HAFLEY Dan**

---

**From:** HAFLEY Dan  
**Sent:** Tuesday, August 01, 2017 3:08 PM  
**To:** GILLES Bruce A  
**Cc:** SEIDEL Paul; JOHNSON Tiffany  
**Subject:** Portland Airport - PFAS data

Bruce –

Just wanted to give you a head's up that we have received analytical results from groundwater sampling at the Portland International Airport (PIA) Oil Fire Training Pits. This area was historically used by both Port and Air National Guard personnel for fire training using aqueous film-forming foams. PFOS and PFOA were detected in the water table aquifer to a maximum of 203,000 ng/L and 30,900 ng/L respectively, significantly exceeding EPA's health advisory concentration of 70 ng/L. There are a number of concerns associated with the releases as follows: a) the potential for lateral migration and the proximity of the Columbia River; b) the potential for vertical migration of contamination (PFOS and PFOA are denser-than-water) and presence of the West Portland Wellfield in the general vicinity; and c) the potential for facilitated migration via a stormwater sewer crossing the impacted area, which drains to Columbia Slough. [Please note that the sampling results, while public record, have not been disseminated to date in a public forum. Once the nature and extent of contamination are better understood, we expect outreach to occur].

The Port is moving forward with preparation of both a facility-wide PA to assess the extent of historical storage, use, spillage, etc. of fire-fighting foam material, and a work plan for further characterization of contamination in this area. They are interested in "getting ahead of this issue" with the acknowledgement that both EPA and states are moving to regulate these compounds.

Separately, a work plan is in place for multi-media (soil, groundwater, surface water) sampling at the adjoining Portland Air National Guard base, which will occur in 2018. Work will focus on areas of historical AFFF storage, use, spills that were previously identified. Monies have been allocated, a federal contractor has now been selected and work will move forward (was supposed to have occurred in 2017, but higher-priority bases were identified). We expect that per- and poly-alkylated fluorinated compounds will be detected.

I know that both you and the PMT are very busy, but would ask you to consider the recognition of PFAS including PFOS and PFOA as hazardous substances under Oregon rule. As you know, PFAS are not listed as CERCLA hazardous substances, but may be addressed as CERCLA pollutants or contaminants (40 CFR 300.5). CERCLA investigations are beginning to include PFAS where supported by the conceptual site model. A number of states have formally adopted risk-based screening and/or cleanup standards for these compounds.

Thanks for your consideration.

Dan Hafley



**HAFLEY Dan**

---

**From:** Jones, Stan <Stan.Jones@portofportland.com>  
**Sent:** Wednesday, July 19, 2017 3:23 PM  
**To:** HAFLEY Dan (dan.hafley@state.or.us)  
**Cc:** Jacobs, Teresa; Adam Reese (ARese@apexcos.com); Clough, Herb  
**Subject:** PDX Fire Training Area Status

Dan,

Tried to call you a couple times this week, so I'm not sure if you are around. I'm headed out on vacation and will be back on Tuesday August 1<sup>st</sup> and wanted to give you a status report.

The Airport Wide Fire Training Overview PA is slightly behind schedule due to vacation schedules so I apologize for the delay. We have the draft from APEX and the plan is to have it to you at the end of the month.

I have APEX working on the Draft Work Scope for the next phase of work. I should have something to review when I return on August 1<sup>st</sup>. I hate to curse it, but I'm hoping it won't need much massaging to get it out as a final draft to you. That may be a good opportunity to sit down and go over the plan and look ahead.

If you need to reach me between now and August 1st, please leave me a message on my cell phone 503.807.6585. You may also call Teresa Jacobson who has stepped into the Project for David Ashton and is now fully up to speed. She can be reached at 503.415.6148.

Stan





3015 SW First Avenue  
Portland, Oregon 97201-4707  
(503) 924-4704 Phone  
(503) 943-6357 Fax

## TRANSMITTAL MEMORANDUM

**Date:** June 21, 2017

**Project Number:** 2333-00

**Subject:** Reconnaissance Well Sampling – April 2017,  
ECSI No. 3324

**To:** Oregon DEQ  
Attn: Dan Hafley  
700 NE Multnomah Street, Suite 600  
Portland, Oregon 97232

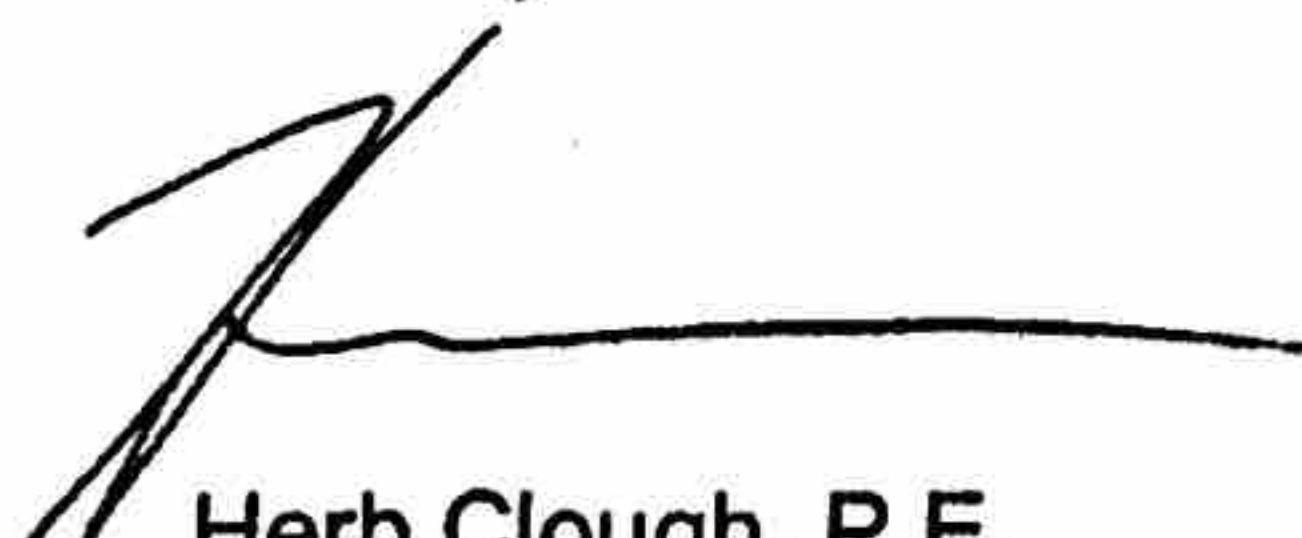
<b>WE ARE SENDING YOU:</b> <input checked="" type="checkbox"/> Attached or <input type="checkbox"/> Under Separate Cover:			
<input checked="" type="checkbox"/> Report	<input type="checkbox"/> Letter	<input type="checkbox"/> Plans	<input type="checkbox"/> Specifications
<input type="checkbox"/> Proposal	<input type="checkbox"/> Contract	<input type="checkbox"/> Samples	<input type="checkbox"/> Other

<b>THESE ARE TRANSMITTED AS CHECKED BELOW:</b>			
<input type="checkbox"/> As Requested	<input checked="" type="checkbox"/> For Your Use	<input type="checkbox"/> For Review and Comment	<input type="checkbox"/> For Approval

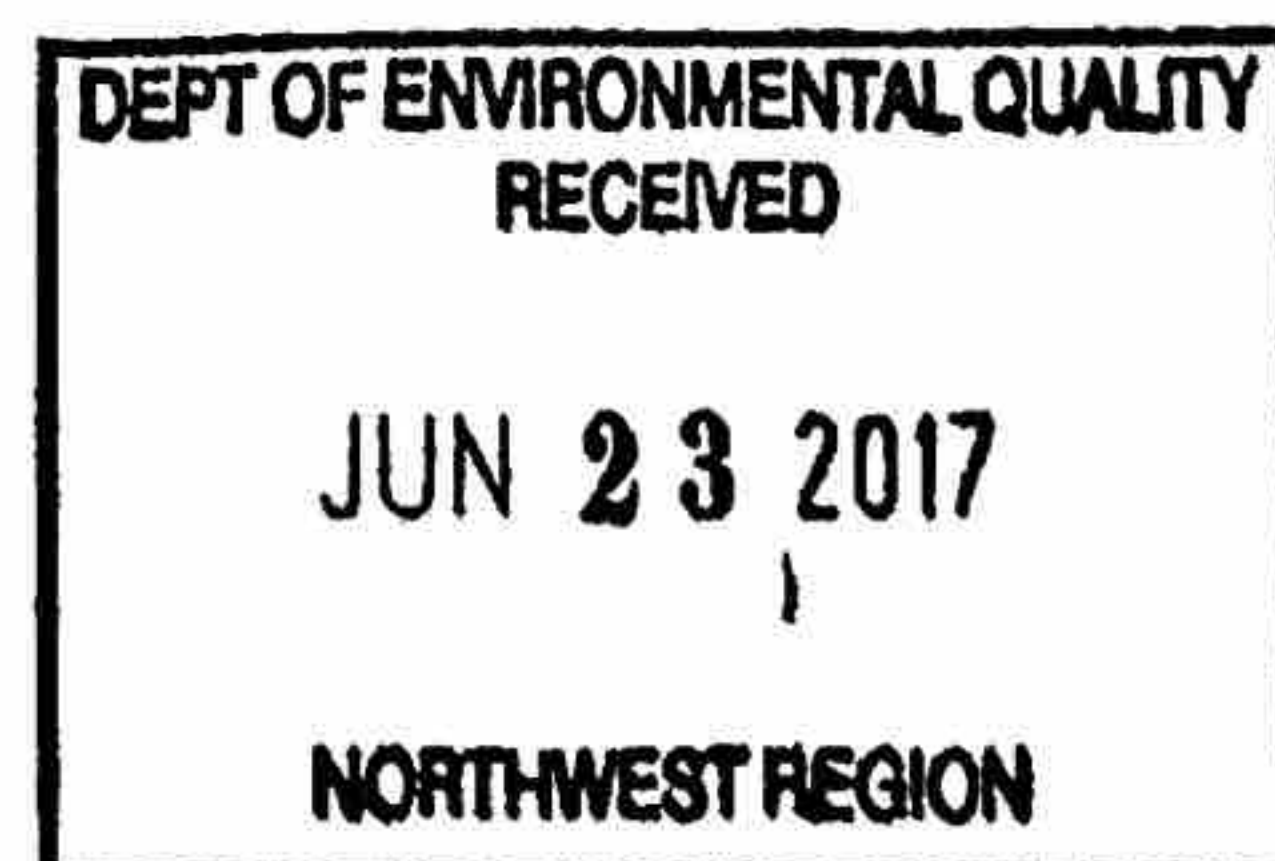
Copies	Date	Description
3	6/19/2017	Reconnaissance Well Sampling – April 2017, Original and Former Fire Training Pits, Portland International Airport, Portland, Oregon, ECSI No. 3324

### Remarks:

Enclosed, please find two hard copies (each with accompanying CD copy) and one separate electronic (CD) copies of the above-referenced report. Please feel free to contact me if you have any questions. Thank you.

  
Herb Clough, P.E.  
Principal Engineer

**cc:** Stan Jones, Port of Portland (3 hard copies)





COMM

**HAFLEY Dan**

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**From:** HAFLEY Dan  
**Sent:** Tuesday, June 20, 2017 3:54 PM  
**To:** 'Adam Reese'  
**Cc:** Stanton Jones; Herb Clough; Ashton, David; Whitlock, Ian; Read, Daniel; Jacobs, Teresa  
**Subject:** RE: Fire Training Facilities Reconnaissance Well Sampling Report

Adam –

DEQ reviewed and approve the **Reconnaissance Well Sampling Report**. As high concentrations of PFOS and PFOA were detected in groundwater samples in former fire training areas, and the extent of contamination has not been defined, additional investigation will be necessary. Please contact us to discuss next steps; we understand that a report documenting historical uses of AFFF-containing fire-fighting chemicals at Portland International Airport is forthcoming.

Respectfully,

Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ  
(503) 229-5417

---

**From:** Adam Reese [<mailto:AREese@apexcos.com>]  
**Sent:** Monday, June 19, 2017 4:49 PM  
**To:** HAFLEY Dan  
**Cc:** Stanton Jones; Herb Clough; Ashton, David; Whitlock, Ian; Read, Daniel; Jacobs, Teresa  
**Subject:** Fire Training Facilities Reconnaissance Well Sampling Report

Dan,

Good afternoon. On behalf of the Port of Portland, please find attached a Reconnaissance Well Sampling Report for the Fire Training Facilities Area. Please let us know if you have any questions or comments.

Please also note that the attached file is large (10 MB), so please respond to confirm that you receive the attachment.

Thanks,

Adam




**Adam Reese, R.G., C.E.G.**

Division Manager

**Apex Companies, LLC**

3015 SW First Avenue  
Portland, OR 97201

O) 503-924-4704 x1902 M) 503-502-2728

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**HAFLEY Dan**

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**From:** Jones Stan [Stan Jones@portofportland.com]  
**Sent:** Thursday June 15, 2017 9:02 AM  
**To:** HAFLEY Dan (dan.hafley@state.or.us)  
**Cc:** Read, Daniel; Jacobs, Teresa; Adam Reese (AReese@apexcos.com); Herb Clough (HClough@apexcos.com)  
**Subject:** PDX Fire Training Area Report

Dan,

You will receive the final GW sampling report on Monday!

I am supposed to receive the DRAFT PA/History report on Monday and hope to get that to you before the 4<sup>th</sup> of July.

I plan to have a next phase work plan to you by July 31<sup>st</sup>.

Is this acceptable to you?

Stan



# Historical PDX Fire Training Areas Investigation

Meeting to discuss initial groundwater sampling results

June 6, 2017

09:00-10:00 Aurora Conference Room

Attendees: Dan Hafley-DEQ; Phil Ralston-Port; Dan Read- Port; Stan Jones- Port; Ian Whitlock – Port;  
Adam Reese- APEX

Introductions

Background and Purpose of Work

Review/Discuss shallow Groundwater Data

Status of Upcoming PDX Fire Training Overview Report

Historical Fire Training Areas -Investigation Next Steps

National Guard Investigation Status



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-1 (17.61)	04/26/94	10.06	--	--	10.06
	08/08/94	8.85	--	--	8.85
	11/08/94	10.85	--	--	10.85
	02/20/95	12.35	--	--	12.35
	05/12/95	11.00	--	--	11.00
	09/18/95	8.88	--	--	8.88
	12/28/95	11.34	--	--	11.34
	02/29/96	12.22	--	--	12.22
	04/23/96	11.52	--	--	11.52
	05/30/96	11.51	--	--	11.51
	06/25/96	10.71	--	--	10.71
	12/11/96	11.24	--	--	11.24
	04/11/97	10.46	--	--	10.46
	10/27/97	9.22	--	--	9.22
	04/23/98	9.38	--	--	9.38
	04/06/99	10.23	--	--	10.23
	04/28/00	9.72	--	--	9.72
	05/07/01	8.75	--	--	8.75
	05/31/02	--	--	--	9.38
	06/04/03	--	--	--	9.63
	05/21/04	--	--	--	8.94
	08/25/05	--	--	--	7.99
	08/10/06	9.15	--	--	8.46
	09/06/07	9.65	--	--	7.96
	04/20/17	6.81	--	--	10.80
MW-2 (17.84)	04/26/94	8.61	--	--	8.61
	08/08/94	8.01	--	--	8.01
	11/08/94	8.73	--	--	8.73
	02/20/95	9.46	--	--	9.46
	05/12/95	8.78	--	--	8.78
	09/18/95	8.07	--	--	8.07
	12/28/95	9.02	--	--	9.02
	02/29/96	10.01	--	--	10.01
	04/23/96	9.27	--	--	9.27
	05/30/96	9.33	--	--	9.33
	06/25/96	9.02	--	--	9.02
	12/11/96	8.67	--	--	8.67
	04/11/97	8.15	--	--	8.15
	10/27/97	7.57	--	--	7.57
	04/23/98	8.34	--	--	8.34
	04/06/99	8.27	--	--	8.27
	04/28/00	8.08	--	--	8.08
	05/07/01	7.05	--	--	7.05
	05/31/02	--	--	--	7.76
	06/04/03	--	--	--	7.80
	05/21/04	--	--	--	7.41
	08/25/05	--	--	--	6.98
	08/10/06	10.44	--	--	7.40
	09/06/07	10.74	--	--	7.10
	04/20/17	9.08	--	--	8.76

Please refer to notes at end of table.



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-3 (17.59)	04/26/94	10.82	--	--	10.82
	08/08/94	9.09	--	--	9.09
	11/08/94	13.66	--	--	13.66
	02/20/95	13.85	--	--	13.85
	05/12/95	12.51	--	--	12.51
	09/18/95	10.68	--	--	10.68
	12/28/95	13.29	--	--	13.29
	02/29/96	14.18	--	--	14.18
	04/23/96	12.70	--	--	12.70
	05/30/96	12.83	--	--	12.83
	06/25/96	12.17	--	--	12.17
	12/11/96	13.63	--	--	13.63
	04/11/97	11.44	--	--	11.44
	10/27/97	9.64	--	--	9.64
	04/23/98	10.80	--	--	10.80
	04/06/99	11.52	--	--	11.52
	04/28/00	11.03	--	--	11.03
	05/07/01	9.98	--	--	9.98
	05/31/02	--	--	--	9.79
	06/04/03	--	--	--	10.77
	05/21/04	--	--	--	9.34
	08/25/05	--	--	--	8.17
	08/10/06	8.85	--	--	8.74
	09/06/07	9.59	--	--	8.00
	04/20/17	6.70	--	--	10.89
MW-4 (18.00)	04/26/94	9.86	--	--	9.86
	08/08/94	8.74	--	--	8.74
	11/08/94	11.42	--	--	11.42
	02/20/95	12.37	--	--	12.37
	05/12/95	10.43	--	--	10.43
	09/18/95	8.76	--	--	8.76
	12/28/95	11.45	--	--	11.45
	02/29/96	12.06	--	--	12.06
	04/23/96	10.95	--	--	10.95
	05/30/96	11.11	--	--	11.11
	06/25/96	10.08	--	--	10.08
	12/11/96	12.42	--	--	12.42
	04/11/97	10.74	--	--	10.74
	10/27/97	10.00	--	--	10.00
	04/23/98	10.05	--	--	10.05
	04/06/99	10.70	--	--	10.70
	04/28/00	10.33	--	--	10.33
	05/07/01	9.71	--	--	9.71
	05/31/02	--	--	--	9.79
	06/04/03	--	--	--	10.21
	05/21/04	--	--	--	9.52
	08/25/05	--	--	--	8.72
	08/10/06	8.77	--	--	9.23
	09/06/07	9.44	--	--	8.56
	04/20/17	7.08	--	--	10.92

Please refer to notes at end of table.



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-5 (19.88)	04/26/94	8.69	--	--	8.69
	08/08/94	8.16	--	--	8.16
	11/08/94	9.92	--	--	9.92
	02/20/95	12.21	--	--	12.21
	05/12/95	9.17	--	--	9.17
	09/18/95	8.19	--	--	8.19
	12/28/95	10.72	--	--	10.72
	02/29/96	11.27	--	--	11.27
	04/23/96	9.73	--	--	9.73
	05/30/96	9.75	--	--	9.75
	06/25/96	9.11	--	--	9.11
	12/11/96	10.92	--	--	10.92
	04/11/97	11.42	--	--	11.42
	10/27/97	9.71	--	--	9.71
	04/23/98	10.04	--	--	10.04
	04/06/99	10.59	--	--	10.59
	04/28/00	10.26	--	--	10.26
	05/07/01	9.69	--	--	9.69
	05/31/02	--	--	--	10.00
	06/04/03	--	--	--	10.30
	05/21/04	--	--	--	9.75
	08/25/05	--	--	--	9.14
	08/10/06	10.31	--	--	9.57
	09/06/07	10.69	--	--	9.19
	04/20/17	10.65	--	--	9.23
MW-6 (18.08)	04/26/94	9.72	--	--	9.72
	08/08/94	8.87	--	--	8.87
	11/08/94	10.97	--	--	10.97
	02/20/95	13.04	--	--	13.04
	05/12/95	11.01	--	--	11.01
	09/18/95	8.93	--	--	8.93
	12/28/95	11.37	--	--	11.37
	02/29/96	12.43	--	--	12.43
	04/23/96	11.32	--	--	11.32
	05/30/96	11.50	--	--	11.50
	06/25/96	10.25	--	--	10.25
	12/11/96	12.11	--	--	12.11
	04/11/97	11.08	--	--	11.08
	10/27/97	9.60	--	--	9.60
	04/23/98	10.42	--	--	10.42
	04/06/99	11.38	--	--	11.38
	04/28/00	9.54	--	--	9.54
	05/07/01	9.09	--	--	9.09
	05/31/02	--	--	--	9.57
	06/04/03	--	--	--	9.86
	05/21/04	--	--	--	9.10
	08/25/05	--	--	--	8.40
	08/10/06	9.22	--	--	8.86
	09/06/07	9.82	--	--	8.26
	04/20/17	5.80	--	--	12.28

Please refer to notes at end of table.



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-7 (17.61)	04/26/94	8.64	--	--	8.64
	08/08/94	7.85	--	--	7.85
	11/08/94	9.40	--	--	9.40
	02/20/95	10.47	--	--	10.47
	05/12/95	9.18	--	--	9.18
	09/18/95	8.07	--	--	8.07
	12/28/95	9.68	--	--	9.68
	02/29/96	9.99	--	--	9.99
	04/23/96	9.42	--	--	9.42
	05/30/96	9.38	--	--	9.38
	06/25/96	8.91	--	--	8.91
	12/11/96	9.61	--	--	9.61
	04/11/97	8.20	--	--	8.20
	10/27/97	7.93	--	--	7.93
	04/23/98	7.86	--	--	7.86
	04/06/99	8.13	--	--	8.13
	04/28/00	7.92	--	--	7.92
	05/07/01	7.55	--	--	7.55
	05/31/02	--	--	--	7.60
	06/04/03	--	--	--	8.00
	05/21/04	--	--	--	7.87
	08/25/05	--	--	--	7.03
	08/10/06	10.35	--	--	7.26
	09/06/07	10.86	--	--	6.75
	04/20/17	8.98	--	--	8.63
MW-8 (18.15)	04/26/94	8.68	--	--	8.68
	08/08/94	8.16	--	--	8.16
	11/08/94	8.59	--	--	8.59
	02/20/95	10.24	--	--	10.24
	05/12/95	9.74	--	--	9.74
	09/18/95	8.19	--	--	8.19
	12/28/95	10.17	--	--	10.17
	02/29/96	11.33	--	--	11.33
	04/23/96	10.75	--	--	10.75
	05/30/96	10.92	--	--	10.92
	06/25/96	10.33	--	--	10.33
	12/11/96	11.18	--	--	11.18
	04/11/97	10.25	--	--	10.25
	10/27/97	8.76	--	--	8.76
	04/23/98	9.18	--	--	9.18
	04/06/99	10.45	--	--	10.45
	04/28/00	10.20	--	--	10.20
	05/07/01	8.55	--	--	8.55
	05/31/02	--	--	--	9.66
	06/04/03	--	--	--	10.04
	05/21/04	--	--	--	9.10
	08/25/05	--	--	--	8.19
	08/10/06	9.53	--	--	8.62
	09/06/07	10.15	--	--	8.00
	04/20/17	7.18	--	--	10.97

Please refer to notes at end of table.



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-9 (17.07)	08/08/94	10.39	--	--	10.39
	11/08/94	12.98	--	--	12.98
	02/20/95	14.16	--	--	14.16
	05/12/95	12.14	--	--	12.14
	09/18/95	10.75	--	--	10.75
	12/28/95	13.07	--	--	13.07
	02/29/96	13.48	--	--	13.48
	04/23/96	13.21	--	--	13.21
	05/30/96	12.90	--	--	12.90
	06/25/96	12.20	--	--	12.20
	12/11/96	14.30	--	--	14.30
	04/11/97	12.82	--	--	12.82
	10/27/97	11.67	--	--	11.67
	04/23/98	12.33	--	--	12.33
	04/06/99	12.81	--	--	12.81
	04/28/00	12.45	--	--	12.45
	05/07/01	12.01	--	--	12.01
	05/31/02	--	--	--	12.04
	06/04/03	--	--	--	12.24
	05/21/04	--	--	--	11.75
	08/25/05	--	--	--	11.09
	08/10/06	5.72	--	--	11.35
	09/06/07	6.33	--	--	10.74
	04/20/17	4.76	--	--	12.31
MW-10A (17.24)	02/29/96	13.55	--	--	13.55
	04/23/96	12.83	--	--	12.83
	05/30/96	12.66	--	--	12.66
	06/25/96	12.12	--	--	12.12
	12/11/96	13.83	--	--	13.83
	04/11/97	11.53	--	--	11.53
	10/27/97	11.94	--	--	11.94
	04/23/98	12.17	--	--	12.17
	04/06/99	12.66	--	--	12.66
	04/28/00	12.15	--	--	12.15
	05/07/01	12.02	--	--	12.02
	05/31/02	--	--	--	12.00
	06/04/03	--	--	--	11.97
	05/21/04	--	--	--	11.58
	08/25/05	--	--	--	10.96
	08/10/06	6.06	--	--	11.18
	09/06/07	6.54	--	--	10.70
	04/20/17	4.96	--	--	12.28

Please refer to notes at end of table.



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-9 (17.07)	08/08/94	10.39	--	--	10.39
	11/08/94	12.98	--	--	12.98
	02/20/95	14.16	--	--	14.16
	05/12/95	12.14	--	--	12.14
	09/18/95	10.75	--	--	10.75
	12/28/95	13.07	--	--	13.07
	02/29/96	13.48	--	--	13.48
	04/23/96	13.21	--	--	13.21
	05/30/96	12.90	--	--	12.90
	06/25/96	12.20	--	--	12.20
	12/11/96	14.30	--	--	14.30
	04/11/97	12.82	--	--	12.82
	10/27/97	11.67	--	--	11.67
	04/23/98	12.33	--	--	12.33
	04/06/99	12.81	--	--	12.81
	04/28/00	12.45	--	--	12.45
	05/07/01	12.01	--	--	12.01
	05/31/02	--	--	--	12.04
	06/04/03	--	--	--	12.24
	05/21/04	--	--	--	11.75
	08/25/05	--	--	--	11.09
	08/10/06	5.72	--	--	11.35
	09/06/07	6.33	--	--	10.74
	04/20/17	4.76	--	--	12.31
MW-10A (17.24)	02/29/96	13.55	--	--	13.55
	04/23/96	12.83	--	--	12.83
	05/30/96	12.66	--	--	12.66
	06/25/96	12.12	--	--	12.12
	12/11/96	13.83	--	--	13.83
	04/11/97	11.53	--	--	11.53
	10/27/97	11.94	--	--	11.94
	04/23/98	12.17	--	--	12.17
	04/06/99	12.66	--	--	12.66
	04/28/00	12.15	--	--	12.15
	05/07/01	12.02	--	--	12.02
	05/31/02	--	--	--	12.00
	06/04/03	--	--	--	11.97
	05/21/04	--	--	--	11.58
	08/25/05	--	--	--	10.96
	08/10/06	6.06	--	--	11.18
	09/06/07	6.54	--	--	10.70
	04/20/17	4.96	--	--	12.28

Please refer to notes at end of table.



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-11 (17.35)	02/29/96	12.84	--	--	12.84
	04/23/96	12.47	--	--	12.47
	05/30/96	12.35	--	--	12.35
	06/25/96	11.94	--	--	11.94
	12/11/96	13.35	--	--	13.35
	04/11/97	12.17	--	--	12.17
	10/27/97	11.63	--	--	11.63
	04/23/98	11.88	--	--	11.88
	04/06/99	12.24	--	--	12.24
	04/28/00	11.87	--	--	11.87
	05/07/01	11.85	--	--	11.85
	05/31/02	--	--	--	11.71
	06/04/03	--	--	--	11.80
	05/21/04	--	--	--	11.58
	08/25/05	--	--	--	11.13
	08/10/06	6.13	--	--	11.22
	09/06/07	6.55	--	--	10.80
	04/20/17	5.33	--	--	12.02
MW-12 (19.71)	02/29/96	12.67	--	--	12.67
	04/23/96	10.36	--	--	10.36
	05/30/96	10.34	--	--	10.34
	06/25/96	9.39	--	--	9.39
	12/11/96	13.80	--	--	13.80
	04/11/97	12.56	12.48	0.08	7.21
	10/27/97	9.84	9.56	0.28	10.09
	04/23/98	10.75	10.72	0.03	8.98
	04/06/99	12.33	--	--	12.33
	04/28/00	10.81	--	--	10.81
	05/07/01	10.09	--	--	10.09
	05/31/02	--	--	--	10.53
	06/04/03	--	--	--	11.24
	05/21/04	--	--	--	10.75
	08/25/05	--	--	--	9.08
	08/10/06	10.11	--	--	9.60
	09/06/07	10.68	--	--	9.03
	04/20/17	6.59	6.44	0.15	13.24
MW-13 (18.53)	02/29/96	15.68	--	--	15.68
	04/23/96	15.10	--	--	15.10
	05/30/96	14.48	--	--	14.48
	06/25/96	13.71	--	--	13.71
	12/11/96	16.77	--	--	16.77
	04/11/97	14.55	--	--	14.55
	10/27/97	13.59	--	--	13.59
	04/23/98	14.03	--	--	14.03
	04/06/99	14.71	--	--	14.71
	04/28/00	13.90	--	--	13.90
	05/07/01	13.50	--	--	13.50
	05/31/02	--	--	--	13.38
	06/30/03	--	--	--	13.73
	05/21/04	--	--	--	13.26
	08/25/05	--	--	--	12.68
	08/10/06	5.55	--	--	12.98
	09/06/07	6.02	--	--	12.51
	04/20/17	3.30	--	--	15.23

Please refer to notes at end of table.



**Table 1**  
**Groundwater Elevations**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Monitoring Well (Elevation in Feet MSL) <sup>10</sup>	Sampling Date	Depth to Water	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevations (feet)
MW-14 (17.73)	02/29/96	15.46	—	—	15.46
	04/23/96	14.83	—	—	14.83
	05/30/96	14.37	—	—	14.37
	06/25/96	13.81	—	—	13.81
	12/11/96	16.26	—	—	16.26
	04/11/97	14.43	—	—	14.43
	10/27/97	13.35	—	—	13.35
	04/23/98	13.91	—	—	13.91
	04/06/99	14.64	—	—	14.64
	04/28/00	13.93	—	—	13.93
	05/07/01	13.71	—	—	13.71
	05/31/02	—	—	—	13.45
	06/04/03	—	—	—	13.79
	05/21/04	—	—	—	13.35
	08/25/05	—	—	—	12.75
	08/10/06	4.61	—	—	13.12
	09/06/07	5.05	—	—	12.68
	04/20/17	2.51	—	—	15.22

**Notes:**

1. feet MSL = Feet above mean sea level.
2. Casing elevations and groundwater data prior to December 1996 are from a Draft Quarterly Groundwater Monitoring Report dated December 12, 1996, and prepared by Geraghty & Miller.
3. NM = Water level not measured.
4. — = No product.
5. Elevation was corrected in wells with the presence of measurable separate-phase petroleum hydrocarbons using the following equation and assuming a specific gravity for gasoline product of 0.8 gram per cubic centimeter (Merck, 1989):

$$h_w = \frac{p_g h_g}{p_w}$$

water-level elevation = top of casing elevation + [h<sub>w</sub> - d<sub>w</sub>]

where:

h<sub>w</sub> = depth to groundwater correction

p<sub>w</sub> = density of water

d<sub>w</sub> = depth to groundwater measuring point

h<sub>g</sub> = product thickness

p<sub>g</sub> = density of separate-phase hydrocarbons

Reference: Merck Index 1989, An Encyclopedia of Chemicals, Drugs and Biologicals,  
 Merck and Company, Rahway, New Jersey.



Table 2

Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals  
 Reconnaissance Well Sampling  
 Fire Training Facilities  
 Portland International Airport  
 Portland, Oregon

1 ppm

Sample Identification:	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
	4/20/2017	4/21/2017	4/20/2017	4/20/2017	4/21/2017	4/21/2017		
Sample Date:	4/20/2017	4/21/2017	4/20/2017	4/20/2017	4/21/2017	4/21/2017		
Total Petroleum Hydrocarbons (µg/L)								
Diesel	<93.5	<95.2	<93.5	<93.5	<95.2	<95.2	-	100
Oil	<187	<190	<187	<187	<190	<190	-	300
Volatile Organic Compounds (µg/L)								
Acetone	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	1500	-
Benzene	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	130	0.46
Bromobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	-	-
Bromochloromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
Bromodichloromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	0.13
Bromoform	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	320	3.3
Bromomethane	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	-	7.5
2-Butanone (MEK)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	14000	-
n-Butylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
sec-Butylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
tert-Butylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
Carbon tetrachloride	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	74	0.46
Chlorobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	50	77
Chloroethane	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	-	21000
Chloroform	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1240	0.22
Chloromethane	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	-	190
2-Chlorotoluene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
4-Chlorotoluene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
1,2-Dibromo-3-chloropropane	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	-	-
Dibromochloromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	0.17
1,2-Dibromoethane (EDB)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	-	0.0075
Dibromomethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
1,2-Dichlorobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	14	300
1,3-Dichlorobenzene	0.300 J	0.265 J	0.500	0.320 J	0.284 J	<0.250	71	-
1,4-Dichlorobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	15	0.48
Dichlorodifluoromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	-	-
1,1-Dichloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	47	2.8
1,2-Dichloroethane (EDC)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	20000	0.17
1,1-Dichloroethene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	25	280

See notes at the end of table.



**Table 2**  
**Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Sample Identification:	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
	4/20/2017	4/21/2017	4/20/2017	4/20/2017	4/21/2017	4/21/2017		
Sample Date:								
cis-1,2-Dichloroethene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	590	36
trans-1,2-Dichloroethene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	590	360
1,2-Dichloropropane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	5700	–
1,3-Dichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
2,2-Dichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
1,1-Dichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
cis-1,3-Dichloropropene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
trans-1,3-Dichloropropene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
Ethylbenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	7.3	1.5
Hexachlorobutadiene	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	9.3	–
2-Hexanone	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	99	–
Isopropylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	440
4-Isopropyltoluene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
4-Methyl-2-pentanone (MIBK)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	170	–
Methyl tert-butyl ether (MTBE)	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	14
Methylene chloride	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	2200	11
Naphthalene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	620	0.17
n-Propylbenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	–	–
Styrene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	1200
1,1,1,2-Tetrachloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	186	–
1,1,2,2-Tetrachloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	2400	–
Tetrachloroethene (PCE)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	840	12
Toluene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	9.8	1100
1,2,3-Trichlorobenzene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	–	–
1,2,4-Trichlorobenzene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	110	–
1,1,1-Trichloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	11	8000
1,1,2-Trichloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	9400	0.28
Trichloroethene (TCE)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	21900	0.49
Trichlorofluoromethane	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	–	1100
1,2,3-Trichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
1,2,4-Trimethylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	15
1,3,5-Trimethylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	110

See notes at the end of table.



**Table 2**  
**Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Sample Identification:	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
	4/20/2017	4/21/2017	4/20/2017	4/20/2017	4/21/2017	4/21/2017		
Sample Date:								
Vinyl chloride	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	–	0.027
m,p-Xylene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	13	190
o-Xylene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250		
<b>Polychlorinated Biphenyls (µg/L)</b>								
Aroclor 1016	<0.0467	–	<0.0467	<0.0467	–	–	–	–
Aroclor 1221	<0.0467	–	<0.0467	<0.0467	–	–	0.28	–
Aroclor 1232	<0.0467	–	<0.0467	<0.0467	–	–	0.58	–
Aroclor 1242	<0.0467	–	<0.0467	<0.0467	–	–	0.053	–
Aroclor 1248	<0.0467	–	<0.0467	<0.0467	–	–	0.081	–
Aroclor 1254	<0.0467	–	<0.0467	<0.0467	–	–	0.033	–
Aroclor 1260	<0.0467	–	<0.0467	<0.0467	–	–	94	–
Total Polychlorinated Biphenyls	<0.0467	–	<0.0467	<0.0467	–	–	0.014	0.006
<b>Semi-Volatile Organic Compounds (µg/L)</b>								
Acenaphthene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	520	510
Acenaphthylene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	–
Anthracene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	13	>S
Benzo(a)anthracene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	0.027	0.012
Benzo(a)pyrene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	0.014	0.0034
Benzo(b)fluoranthene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	0.034
Benzo(k)fluoranthene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	0.34
Benzo(g,h,i)perylene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	–
Chrysene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	>S
Dibenz(a,h)anthracene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	0.0034
Dibenzofuran	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	3.7	–
Fluoranthene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	6.16	>S
Fluorene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	3.9	280
Indeno(1,2,3-cd)pyrene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	0.034
1-Methylnaphthalene	<0.0381	<0.0377	<0.0385	<0.0381	<0.0377	<0.0377	2.1	–
2-Methylnaphthalene	<0.0381	<0.0377	<0.0385	<0.0381	<0.0377	<0.0377	–	–
Naphthalene	<0.0381	<0.0377	<0.0385	<0.0381	<0.0377	<0.0377	620	0.17
Phenanthrene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	6.3	–
Pyrene	<0.0190	<0.0189	<0.0192	<0.0190	<0.0189	<0.0189	–	110

See notes at the end of table.



Table 2  
Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals  
Reconnaissance Well Sampling  
Fire Training Facilities  
Portland International Airport  
Portland, Oregon

Sample Identification:		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
Sample Date:		4/20/2017	4/21/2017	4/20/2017	4/20/2017	4/21/2017	4/21/2017		
<b>Metals (µg/L)</b>									
Arsenic	Total	27.6	4.02	5.90	3.00	4.58	2.73	150	0.052
	Dissolved	28.1	3.39	5.48	2.63	4.22	2.36		
Barium	Total	60.6	95.1	80.2	51.6	54.1	20.5	4.0	-
	Dissolved	55.3	76.4	76.6	44.5	47.9	19.3		
Cadmium	Total	0.156 J	0.133 J	0.0667 J	<0.0400	0.0444 J	<0.0400	2.2	20
	Dissolved	<0.0400	<0.0400	0.0444 J	<0.0400	<0.0400	<0.0400		
Chromium	Total	1.04	0.656 J	2.94	0.656 J	2.03	<0.500	74	30000
	Dissolved	1.09	1.77	2.29	0.967 J	1.77	<0.500		
Lead	Total	0.167 J	0.167 J	0.189 J	<0.100	0.644	<0.100	2.5	15
	Dissolved	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Mercury	Total	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	0.77	6.0
	Dissolved	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400		
Selenium	Total	<0.500	<0.500	0.533 J	<0.500	0.500 J	<0.500	5.0	-
	Dissolved	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500		
Silver	Total	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	0.12	100
	Dissolved	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		

See notes at the end of table.



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**Table 2**  
**Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Sample Identification:	MW-7		MW-8	MW-9	MW-10A	MW-11	MW-13	MW-14	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
	Sample Date:	4/20/2017	4/20/2017 DUP	4/21/2017	4/20/2017	4/21/2017	4/20/2017	4/21/2017		
		4/20/2017	4/20/2017	4/20/2017	4/21/2017	4/20/2017	4/21/2017	4/21/2017		
Total Petroleum Hydrocarbons (ug/L)										
Diesel	<93.5	<93.5	<95.2	<93.5	<95.2	1,900 J	<95.2	<95.2	--	100
Oil	<187	<187	<190	<187	<190	3,230 J	<190	<190	--	300
Volatile Organic Compounds (ug/L)										
Acetone	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	1500	--
Benzene	<0.100	<0.100	<0.100	<0.100	<0.100	0.108 J	<0.100	<0.100	130	0.46
Bromobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	--	--
Bromochloromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	--
Bromodichloromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	0.13
Bromoform	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	320	3.3
Bromomethane	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	--	7.5
2-Butanone (MEK)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	14000	--
n-Butylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	0.672 J	<0.500	<0.500	--	--
sec-Butylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	0.595 J	<0.500	<0.500	--	--
tert-Butylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	--
Carbon tetrachloride	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	74	0.46
Chlorobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	50	77
Chloroethane	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	--	21000
Chloroform	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1240	0.22
Chloromethane	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	--	190
2-Chlorotoluene	<0.500	<0.500	<0.500	<0.500	<0.500	1.35	<0.500	<0.500	--	--
4-Chlorotoluene	<0.500	<0.500	<0.500	<0.500	<0.500	0.734 J	<0.500	<0.500	--	--
1,2-Dibromo-3-chloropropane	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	--	--
Dibromochloromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	0.17
1,2-Dibromoethane (EDB)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	--	0.0075
Dibromomethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	--
1,2-Dichlorobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	14	300
1,3-Dichlorobenzene	0.330 J	<0.250	0.255 J	0.410 J	<0.250	0.339 J	<0.250	<0.250	71	--
1,4-Dichlorobenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	15	0.48
Dichlorodifluoromethane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	--	--
1,1-Dichloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	47	2.8
1,2-Dichloroethane (EDC)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	20000	0.17
1,1-Dichloroethene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	25	280

See notes at the end of table

See notes at the end of table.



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**Table 2**  
Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals  
Reconnaissance Well Sampling  
Fire Training Facilities  
Portland International Airport  
Portland, Oregon

Sample Identification: Sample Date:	MW-7		MW-8	MW-9	MW-10A	MW-11	MW-13	MW-14	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
	4/20/2017	4/20/2017 DUP	4/21/2017	4/20/2017	4/21/2017	4/20/2017	4/21/2017	4/21/2017		
cis-1,2-Dichloroethene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	590	36
trans-1,2-Dichloroethene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	590	360
1,2-Dichloropropane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	5700	–
1,3-Dichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
2,2-Dichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
1,1-Dichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
cis-1,3-Dichloropropene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
trans-1,3-Dichloropropene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
Ethylbenzene	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	7.3	1.5
Hexachlorobutadiene	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50	9.3	–
2-Hexanone	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	99	–
Isopropylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	0.661 J	<0.500	<0.500	–	440
4-Isopropyltoluene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
4-Methyl-2-pentanone (MIBK)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	170	–
Methyl tert-butyl ether (MTBE)	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	14
Methylene chloride	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	<1.50	2200	11
Naphthalene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	620	0.17
n-Propylbenzene	<0.250	<0.250	<0.250	<0.250	<0.250	1.78	<0.250	<0.250	–	–
Styrene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	1200
1,1,1,2-Tetrachloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	186	–
1,1,2,2-Tetrachloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	2400	–
Tetrachloroethene (PCE)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	840	12
Toluene	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	9.8	1100
1,2,3-Trichlorobenzene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	–	–
1,2,4-Trichlorobenzene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	110	–
1,1,1-Trichloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	11	8000
1,1,2-Trichloroethane	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	9400	0.28
Trichloroethene (TCE)	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	21900	0.49
Trichlorofluoromethane	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	–	1100
1,2,3-Trichloropropane	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	–	–
1,2,4-Trimethylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	78.8	<0.500	<0.500	–	15
1,3,5-Trimethylbenzene	<0.500	<0.500	<0.500	<0.500	<0.500	13.5	<0.500	<0.500	–	110

See notes at the end of table.



**Table 2**  
**Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Sample Identification:	MW-7		MW-8	MW-9	MW-10A	MW-11	MW-13	MW-14	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
	4/20/2017	4/20/2017 DUP								
Vinyl chloride	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	–	0.027
m,p-Xylene	<0.500	<0.500	<0.500	<0.500	<0.500	0.954 J	<0.500	<0.500	13	190
o-Xylene	<0.250	<0.250	<0.250	<0.250	<0.250	1.32	<0.250	<0.250	–	–
<b>Polychlorinated Biphenyls (µg/L)</b>										
Aroclor 1016	<0.0472	<0.0472	–	<0.0472	<0.0472	–	–	–	–	–
Aroclor 1221	<0.0472	<0.0472	–	<0.0472	<0.0472	–	–	–	0.28	–
Aroclor 1232	<0.0472	<0.0472	–	<0.0472	<0.0472	–	–	–	0.58	–
Aroclor 1242	<0.0472	<0.0472	–	<0.0472	<0.0472	–	–	–	0.053	–
Aroclor 1248	<0.0472	<0.0472	–	<0.0472	<0.0472	–	–	–	0.081	–
Aroclor 1254	<0.0472	<0.0472	–	<0.0472	<0.0472	–	–	–	0.033	–
Aroclor 1260	<0.0472	<0.0472	–	<0.0472	0.0778 J	–	–	–	94	–
Total Polychlorinated Biphenyls	<0.0472	<0.0472	–	<0.0472	0.0778 J	–	–	–	0.014	0.006
<b>Semi-Volatile Organic Compounds (µg/L)</b>										
Acenaphthene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	<1.05	<0.0187	<0.0189	520	510
Acenaphthylene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	<1.05	<0.0187	<0.0189	–	–
Anthracene	<0.0190	<0.0192	<0.0187	<0.0190	0.0287 J	<0.210	<0.0187	<0.0189	13	>S
Benz(a)anthracene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.100 J	<0.0187	<0.0189	0.027	0.012
Benzo(a)pyrene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.0718	<0.0187	<0.0189	0.014	0.0034
Benzo(b)fluoranthene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.0595 J	<0.0187	<0.0189	–	0.034
Benzo(k)fluoranthene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.0268 J	<0.0187	<0.0189	–	0.34
Benzo(g,h,i)perylene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.0559	<0.0187	<0.0189	–	–
Chrysene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.133 J	<0.0187	<0.0189	–	>S
Dibenz(a,h)anthracene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	<0.0190	<0.0187	<0.0189	–	0.0034
Dibenzofuran	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	<0.267	<0.0187	<0.0189	3.7	–
Fluoranthene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.203	<0.0187	<0.0189	6.16	>S
Fluorene	<0.0190	<0.0192	<0.0187	<0.0190	0.0263 J	1.10	<0.0187	<0.0189	3.9	280
Indeno(1,2,3-cd)pyrene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.0329 J	<0.0187	<0.0189	–	0.034
1-Methylnaphthalene	<0.0381	<0.0385	<0.0374	<0.0381	<0.0374	2.65	<0.0374	<0.0377	2.1	–
2-Methylnaphthalene	<0.0381	<0.0385	<0.0374	<0.0381	<0.0374	0.209	<0.0374	<0.0377	–	–
Naphthalene	<0.0381	<0.0385	<0.0374	<0.0381	<0.0374	<0.286	<0.0374	<0.0377	620	0.17
Phenanthrene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.528	<0.0187	<0.0189	6.3	–
Pyrene	<0.0190	<0.0192	<0.0187	<0.0190	<0.0187	0.429	<0.0187	<0.0189	–	110

See notes at the end of table.



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**Table 2**  
**Groundwater Analytical Results – TPH, VOCs, PCBs, and Metals**  
**Reconnaissance Well Sampling**  
**Fire Training Facilities**  
**Portland International Airport**  
**Portland, Oregon**

Sample Identification:  Sample Date:		MW-7		MW-8	MW-9	MW-10A	MW-11	MW-13	MW-14	DEQ SLVs in Surface Water for Aquatic Life	Ingestion and Inhalation Residential
		4/20/2017	4/20/2017 DUP	4/21/2017	4/20/2017	4/21/2017	4/20/2017	4/21/2017	4/21/2017		
Metals (µg/L)											
Arsenic	Total	2.09	2.14	5.23	0.744 J	0.756 J	2.21	<0.500	1.39	150	0.052
	Dissolved	1.01	1.11	4.38	0.556 J	<0.500	1.69	<0.500	<0.500		
Barium	Total	34.3	35.1	125	17.8	56.3	52.3	17.3	24.8	4.0	-
	Dissolved	29.7	29.5	116	15.4	32.1	46.1	16.6	17.6		
Cadmium	Total	<0.0400	0.0444 J	0.156 J	0.178 J	0.189 J	0.0444 J	<0.0400	0.267	2.2	20
	Dissolved	<0.0400	<0.0400	0.144 J	0.189 J	0.0556 J	<0.0400	0.0444 J	<0.0400		
Chromium	Total	0.689 J	0.744 J	1.34	0.989 J	3.77	2.02	<0.500	0.633 J	74	30000
	Dissolved	0.733 J	0.833 J	2.37	0.644 J	0.611 J	1.23	<0.500	0.567 J		
Lead	Total	<0.100	<0.100	0.244	0.978	3.00	6.34	<0.100	0.522	2.5	15
	Dissolved	<0.100	<0.100	<0.100	0.578	0.167 J	3.20	<0.100	<0.100		
Mercury	Total	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	0.77	6.0
	Dissolved	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400		
Selenium	Total	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	5.0	-
	Dissolved	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500		
Silver	Total	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	0.12	100
	Dissolved	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		

**Notes:**

1. µg/L = microgram per liter
2. Bold values indicate the compounds was detected above laboratory detection limits.
3. < = Compound not detected at or above laboratory reporting limit shown.
4. Shading indicates concentration of analyte was detected above at least one applicable risk-based screening level.
5. Highlighted cells indicates concentration of analyte was detected above at the DEQ Guidance for Ecological Risk Assessment Level II Screening Level Values (Surface Water, Aquatic)
6. Italicized values indicate the concentration of analyte was detected above the DEQ Guidance for Ecological Risk Assessment Level II Screening Level Values (Surface Water, Aquatic) and one applicable risk-based screening level.
7. Screening level values for Ecological Risk Assessment from DEQ Level II Guidance (Surface Water, Aquatic).
8. Screening level values for human health from DEQ Risk-Based Concentrations (November 1, 2015 revision).
9. – = Value not available.
10. J = Reported concentration is an estimated value.
11. >S = This groundwater RBC exceeds the solubility limit. Refer to Appendix D for the corresponding value of S. Groundwater concentrations in excess of S indicate that free product may be present. See Section B.2.1.4 for additional information.



# DRAFT

**Table 3**  
Groundwater Analytical Results – PFCs  
Reconnaissance Well Sampling  
Fire Training Facilities  
Portland International Airport  
Portland, Oregon

Sample Identification:	MW-1	MW-3	MW-4	MW-7		MW-9	MW-10A	U.S. EPA Health Advisory Limit
	4/20/2017	4/20/2017	4/20/2017	4/20/2017	4/20/2017 DUP	4/20/2017	4/21/2017	
Concentrations in ng/L								
Perfluorobutanesulfonic acid (PFBS)	60.2	255	5,580	154	137	90.7	35.8	--
Perfluorohexanoic acid (PFHxA)	461	1,640	30,400	1280	1100	460	363	--
Perfluoroheptanoic acid (PFHpA)	188	676	7,130	505	434	99.4	193	--
Perfluorohexanesulfonic acid (PFHxS)	1,190	4,210	23,900	495	589	1,910	1,040	--
Perfluorooctanoic acid (PFOA)	1,050	5,820	9,930	476	568	7,880	30,900	70
Perfluorooctanesulfonic acid (PFOS)	8,680	23,700	203,000	2,710	819	1,360	342	
Perfluorononanoic acid (PFNA)	134	182	<472	76.5	83.9	24.8	43.7	--
Perfluorodecanoic acid (PFDA)	15.1	8.41	12.2	<1.81	2.27	26.8	21.8	--
Methyl perfluorooctanesulfonamidoacetic acid (MeFOSAA)	<1.79	<1.82	<1.84	<1.81	<1.81	<1.78	<1.83	--
Perfluoroundecanoic acid (PFUnA)	<1.79	<1.82	<1.84	<1.81	<1.81	<1.78	<1.83	--
Ethyl perfluorooctanesulfonamidoacetic acid (EtFOSAA)	<1.79	<1.82	<1.84	<1.81	<1.81	<1.78	<1.83	--
Perfluorododecanoic acid (PFDoA)	<1.79	<1.82	<1.84	<1.81	<1.81	<1.78	<1.83	--
Perfluorotridecanoic acid (PFTriDA)	<1.79	<1.82	<1.84	<1.81	<1.81	<1.78	<1.83	--
Perfluorotetradecanoic acid (PFTeDA)	<1.79	<1.82	<1.84	<1.81	<1.81	<1.78	<1.83	--

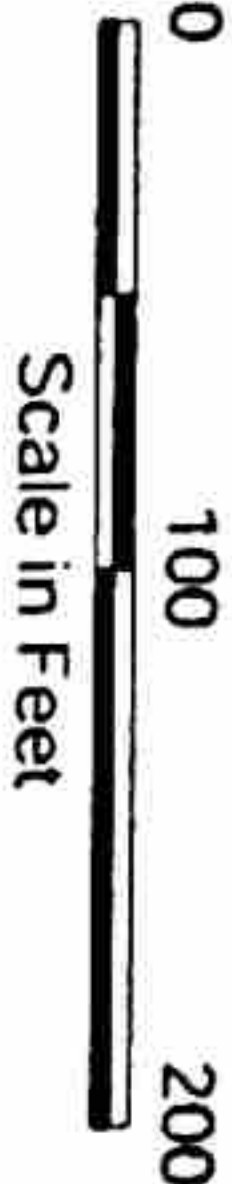
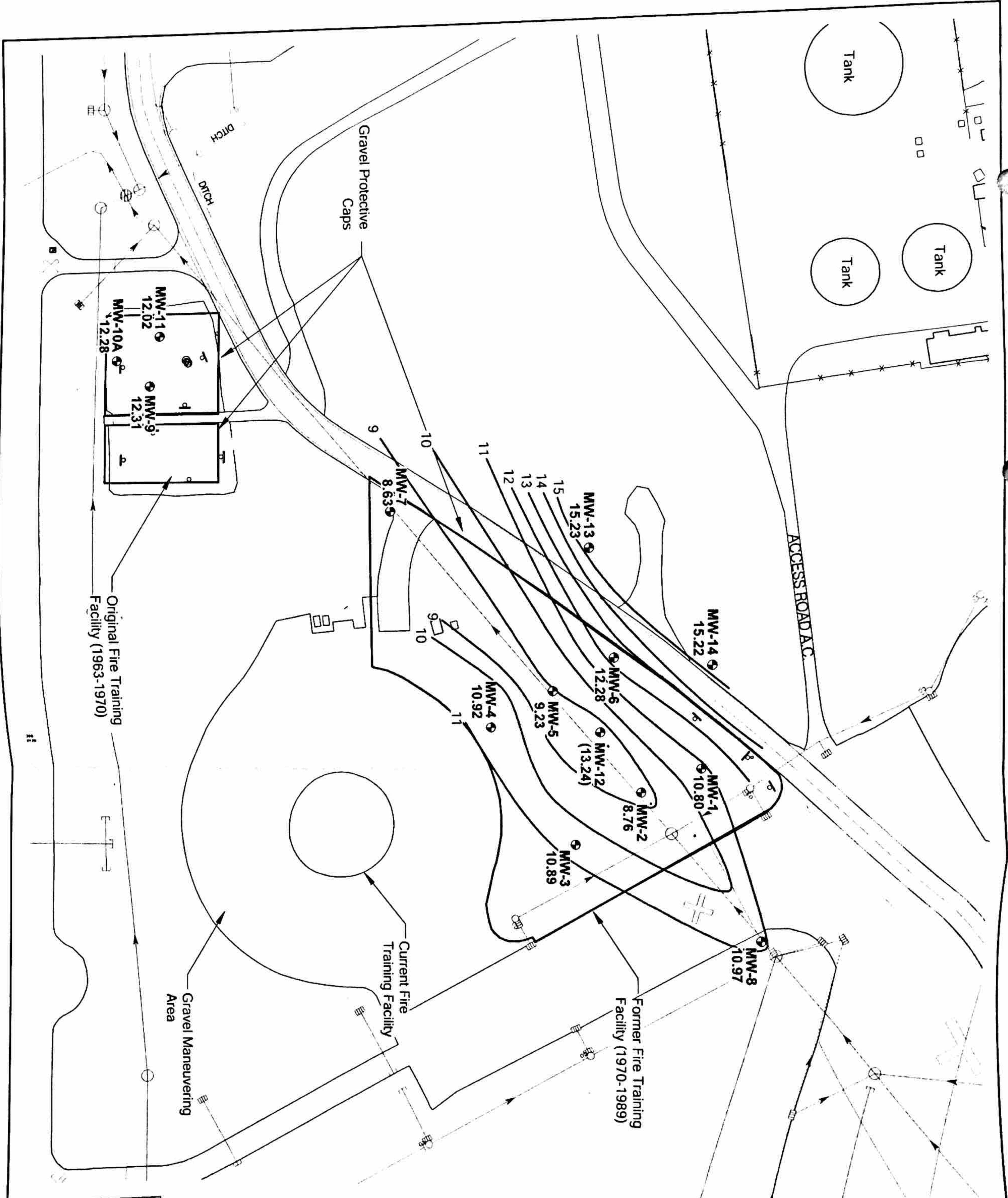
## Notes:

1. ng/L = nanogram per liter (ppt [part per trillion])
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Compound not detected at or above laboratory reporting limit shown.
4. Health advisory limit from the United States Environmental Protection Agency (U.S. EPA) is the combined concentrations of PFOA and PFOS in drinking water.
5. – = Value not available.
6. Shading indicates concentration of analyte was detected above the U.S. EPA health advisory limit for drinking water.



DRAFT

- Legend:
- MW-11 Monitoring Well Location
  - 12.02 Groundwater Elevation in Feet MSL
  - Groundwater Elevation Contour
  - Underground Storm Sewer Pipeline
  - Ditch



Note: Base map prepared from a 2013 Port of Portland AutoCAD base (pdx-features\_POP-LOCAL).

Groundwater Elevations - April 2017

Original and Former Fire Training Facilities

Port of Portland

Portland, Oregon

Apex Companies, LLC  
3015 SW First Avenue  
APEX Portland, Oregon 97201

Project Number	2333-00	Figure
	June 2017	4



DRAFT

Legend:

MW-11

Monitoring Well Location

Underground Storm Sewer Pipeline

Ditch

Location Identification

Concentration in ngl

Analyte Sampled

Highlight Exceeds Relevant SLV

Not Sampled In Accordance With the Work Plan

Not Sampled Due to the Presence of Separate-Phase Hydrocarbons (SPH)

PFOA	Perfluorooctanoic Acid
PFOs	Perfluorooctanesulfonic Acid

	US EPA Health Advisory for Drinking Water
PFOA	70
PFOs	

MW-1	PFOA 1.050
	PFOs 8.680

NS

SPH

MW-13

MW-14

MW-6

MW-12

MW-5

MW-2

MW-1	PFOA 1.050
	PFOs 8.680

MW-3	PFOA 5.820
	PFOs 23.700

MW-4	PFOA 9.930
	PFOs 203.000

MW-7	PFOA 476
	PFOs 2.710

MW-11

MW-9	PFOA 7.880
	PFOs 1.360

MW-10A	PFOA 30.900
	PFOs 342

Original Fire Training Facility (1963-1970)

Former Fire Training Facility (1970-1989)

Current Fire Training Facility

Gravel Maneuvering Area

Gravel Protective Caps

DITCH



Scale in Feet

Note: Base map prepared from a 2013 Port of Portland AutoCAD base (data features: POP-LOCAL).

# Analytical Results - PFOAs/PFOs

Original and Former Fire Training Facilities  
Port of Portland  
Portland, Oregon

Aper Companies, LLC  
3015 SW First Avenue  
Portland, Oregon 97201  
APEX

Project Number 2333-00

June 2017

Figure 8



**HAFLEY Dan**

---

**From:** HAFLEY Dan  
**Sent:** Tuesday, May 02, 2017 2:55 PM  
**To:** Jones, Stan  
**Cc:** ISMERIO Dawn  
**Subject:** RE: Fire Training Areas VCP Oversight Costs

Stan -

Deposit is waived as previously requested during our initial site meeting at Port offices. I will confirm with our Business Office that they have initiated direct invoicing for our oversight costs.

Dan Hafley

---

**From:** Jones, Stan [Stan.Jones@portofportland.com]  
**Sent:** Tuesday, May 02, 2017 8:08 AM  
**To:** HAFLEY Dan ([dan.hafley@state.or.us](mailto:dan.hafley@state.or.us))  
**Cc:** Read, Daniel  
**Subject:** Fire Training Areas VCP Oversight Costs

Dan,

I just remembered I was supposed to send you something in writing that the Port requests that DEQ waive the requirement to pre pay the \$5,000 for the VCP oversight for the Fire Training Areas. I believe that the DEQ has waived this fee on all- or nearly all – the VCP projects I have managed historically.

Please acknowledge this is acceptable. I can put this request into a more formal letter if you would prefer.

Thank You.

Stan





3015 SW First Avenue  
Portland, Oregon 97201-4707  
(503) 924-4704 Phone  
(503) 943-6357 Fax

## TRANSMITTAL MEMORANDUM

**Date:** April 13, 2017

**Project Number:** 2333-00

**Subject:** Reconnaissance Well Sampling Work Plan, Fire Training Facilities

**To:** Oregon DEQ  
Attn: Dan Hafley  
700 NE Multnomah Street, Suite 600  
Portland, Oregon 97232

<b>WE ARE SENDING YOU:</b> <input checked="" type="checkbox"/> Attached or <input type="checkbox"/> Under Separate Cover:			
<input checked="" type="checkbox"/> Report	<input type="checkbox"/> Letter	<input type="checkbox"/> Plans	<input type="checkbox"/> Specifications
<input type="checkbox"/> Proposal	<input type="checkbox"/> Contract	<input type="checkbox"/> Samples	<input type="checkbox"/> Other

<b>THESE ARE TRANSMITTED AS CHECKED BELOW:</b>			
<input type="checkbox"/> As Requested	<input checked="" type="checkbox"/> For Your Use	<input type="checkbox"/> For Review and Comment	<input type="checkbox"/> For Approval

Copies	Date	Description
1	4/13/2017	Reconnaissance Well Sampling Work Plan, Fire Training Facilities, Portland International Airport, Portland, Oregon

### Remarks:

Enclosed, please find one copy of the above-referenced report. Please feel free to contact me if you have any questions. Thank you.

  
Herb Clough, P.E.  
Principal Engineer

**cc:** Stan Jones, Port of Portland (electronic copy)

DEPT OF ENVIRONMENTAL QUALITY RECEIVED
APR 18 2017
NORTHWEST REGION





# Oregon

Kate Brown, Governor

## Department of Environmental Quality

Northwest Region

700 NE Multnomah Street, Suite 600

Portland, OR 97232

(503) 229-5263

FAX (503) 229-6945

TTY 711

April 6, 2017

Stan Jones  
Port of Portland  
PO Box 3529  
Portland, OR 97208

Re: Reconnaissance Well Sampling Work Plan  
Portland Airport Fire Training Pits  
ECSI # 3324

Mr. Jones:

DEQ Northwest Region Cleanup staff reviewed the ***Reconnaissance Well Sampling Work Plan, Fire Training Facilities*** (Work Plan) prepared by Apex for the Portland International Airport facility and dated March 29, 2017. The Work Plan outlines recommendations for reconnaissance-level analysis of a broad suite of environmental contaminants in the so-called “original” and “former” training areas on PIA property. Of notable concern is the potential for perfluorinated compounds associated with past application of aqueous film-forming foam (AFFF) to ground surface, and the potential for contaminants to have impacted groundwater and nearby surface water.

Under the Work Plan, representative groundwater monitoring wells from the two former training areas are to be analyzed for a broad array of contaminant. In general, we are in agreement with the scope and character of proposed work. A few comments/questions are presented for your consideration below. Please review, revise as necessary, and submit a final work Plan for agency approval.

### Comments

Section 3.2 Field Activities. Please include discussion of monitoring for “field parameters” including water temperature, EC, turbidity, etc. Sample turbidity should be minimized to the extent possible prior to sample collection. In addition to parameters identified in Section 2.3 of Appendix A, the color, clarity, and any noticeable odors or evidence of sheen should be documented.

Please identify the positioning of the “intake” (tubing inlet) for proposed sampling using a peristaltic pump. DEQ notes that COPC are of varying specific gravity (for example, TPH < 1 g/ml and PFOS ~1.8 mg/l) which has a bearing on proposed low-flow sampling. Unless



otherwise specified, we recommend confirmation that free product or sheen are not present, followed by collection of samples from the midpoint of the screened interval.

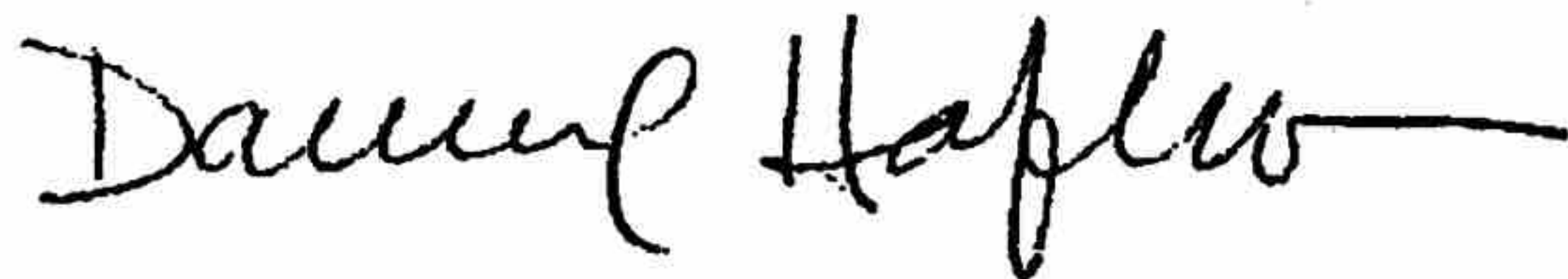
Section 4.1 Analyses for COPCs. DEQ recommends analysis of water samples for both total and dissolved metals, and that a more complete analyte suite be included (RCRA 8 or PPM-13 metals).

Vista indicated that PFAS analytical methods are available for 6, 14, or 24 analytes. The most basic (and inexpensive) list of six is proposed, including PFBS, PFHpA, PFHxS, PFOS, PFOA, and PFNA. The basic list appears acceptable for proposed recon sampling, but is likely to be expanded if PFAS are detected at meaningful concentrations.

Appendix A, Section 4.0. Here or elsewhere in the Work Plan, please identify the location of the proposed field duplicate sample. A location with (historically) elevated contaminant concentrations is recommended.

I can be reached at 503-229-5417 if you have any questions.

Sincerely,



Daniel Hafley  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section

cc: ECSI# 3324 File



**HAFLEY Dan**

---

**From:** Jennifer Miller [jmillier@vista-analytical.com]  
**Sent:** Thursday, April 06, 2017 11:00 AM  
**To:** HAFLEY Dan  
**Subject:** PFAS List Iterations  
**Attachments:** pfas 14 aq RL @ 4 092616.pdf; pfas 24 aq RL @ 4 022217\_Vista.pdf

Thanks, Dan.

Good to talk with you yesterday. Please find the list of 14 PFAS analytes from EPA Method 537 rev 1.1, as well as Vista's more comprehensive list.

As we discussed, the unit price for this full 24-analyte list is \$450; 14-analyte list is \$400.

Let me know if you have any further questions.

Best Regards,

Jennifer Miller  
National Sales  
Mobile: (916) 995-5171



Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
Phone: (916) 673-1520  
[www.vista-analytical.com](http://www.vista-analytical.com)

A woman-owned, small business enterprise.



Please consider the environment before printing this e-mail.

---

**From:** HAFLEY Dan [<mailto:dan.hafley@state.or.us>]  
**Sent:** Thursday, April 06, 2017 10:10 AM  
**To:** Jennifer Miller  
**Subject:** DH email address

Jennifer –

Missing the “deq”. Thanks for your help yesterday.

Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ  
(503) 229-5417



CONF

**HAFLEY Dan**

---

**From:** Jennifer Miller [jmillier@vista-analytical.com]  
**Sent:** Thursday, April 06, 2017 11:00 AM  
**To:** HAFLEY Dan  
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Best Regards,

Jennifer Miller  
National Sales  
Mobile: (916) 995-5171



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Phone: (916) 673-1520  
[www.vista-analytical.com](http://www.vista-analytical.com)

**A woman-owned, small business enterprise.**



Please consider the environment before printing this e-mail.

---

**From:** HAFLEY Dan [mailto:[dan.hafley@state.or.us](mailto:dan.hafley@state.or.us)]  
**Sent:** Thursday, April 06, 2017 10:10 AM  
**To:** Jennifer Miller  
**Subject:** DH email address

Jennifer –

Missing the “deq”. Thanks for your help yesterday.

Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ  
(503) 229-5417



## Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Reporting Limits

<b>Analyte</b>	<b>Aqueous (ng/L)</b>
Perfluorobutane sulfonic acid (PFBS)	4.0
Perfluoroheptanoic acid (PFHpA)	4.0
Perfluorohexane sulfonic acid (PFHxS)	4.0
Perfluorohexanoic acid (PFHxA)	4.0
Perfluorooctane sulfonic acid (PFOS)	4.0
Perfluoro-n-octanoic acid (PFOA)	4.0
Perfluorotetradecanoic acid (PFTeDA)	4.0
Perfluorononanoic acid (PFNA)	4.0
Perfluorodecanoic acid (PFDA)	4.0
Perfluoroundecanoic acid (PFUdA)	4.0
Perfluorododecanoic acid (PFDoA)	4.0
Perfluorotridecanoic acid (PFTrDA)	4.0
N-Ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)	20.0
N-Methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)	20.0



## Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Reporting Limits

<b>Analyte</b>	<b>Aqueous (ng/L)</b>
Perfluorobutanoic acid (PFBA)	4.0
Perfluorobutane sulfonic acid (PFBS)	4.0
Perfluoroheptanoic acid (PFHpA)	4.0
Perfluorohexane sulfonic acid (PFHxS)	4.0
Perfluorohexanoic acid (PFHxA)	4.0
Perfluorooctane sulfonic acid (PFOS)	4.0
Perfluoro-n-octanoic acid (PFOA)	4.0
Perfluoroheptane sulfonate (PFHpS)	4.0
Perfluorodecane sulfonate (PFDS)	4.0
N-Ethyl-heptadecafluorooctane sulfonamide (N-EtFOSA)	20.0
Perfluorotetradecanoic acid (PFTeDA)	4.0
Perfluoropentanoic acid (PFPeA)	4.0
Perfluorononanoic acid (PFNA)	4.0
Perfluorodecanoic acid (PFDA)	4.0
Perfluoroundecanoic acid (PFUdA)	4.0
Perfluorododecanoic acid (PFDoA)	4.0
Perfluorotridecanoic acid (PFTrDA)	4.0
Perfluorooctane sulfonamide (FOSA)	4.0
6:2 Fluorotelomer sulfonate (6:2 FTS)	4.0
N-Methylperfluorooctane sulfonamide (N-MeFOSA)	20.0
N-Methylperfluorooctane sulfonamidoethanol (N-MeFOSE)	20.0
8:2 Fluorotelomer sulfonate (8:2 FTS)	4.0
N-Ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)	20.0
N-Methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)	20.0



**HAFLEY Dan**

---

**From:** Adam Reese [AReese@apexcos.com]  
**Sent:** Wednesday, March 29, 2017 1:11 PM  
**To:** HAFLEY Dan  
**Cc:** Stanton Jones; Herb Clough  
**Subject:** DRAFT Fire Training Facilities Reconnaissance Well Sampling Work Plan  
**Attachments:** DRAFT Fire Training Reconnaissance Well Sampling Work Plan 20170329.pdf

**Importance:** High


Dan,

Good afternoon. On behalf of the Port of Portland, please find attached a DRAFT Reconnaissance Well Sampling Work Plan for the Fire Training Facilities Area. Apologies for the delay on transmitting this – we intended to have it to you this morning. Please let us know if you have any questions or comments. When we've heard back from you, we'll make any necessary modifications, submit the document as FINAL, and then proceed with the fieldwork.

Our tentative field schedule for this sampling event is currently the week of April 24<sup>th</sup>. At this point, we've proposed a 6-compound PFC list that seems to be appropriate for this study. These were the six PFC compounds on EPA's 2012 UCMR list. Jennifer Field of OSU concurred with this approach, indicating that if these are present in the sample then there may other PFCs also present, but at much smaller concentrations (i.e. these 6 are the "icebergs").

Thanks,

Adam



**Adam Reese**, R.G., C.E.G.  
Sr. Assoc. Engineering Geologist, Branch Mgr  
**Apex Companies, LLC**  
3015 SW First Avenue  
Portland, OR 97201  
O) 503-924-4704 x1902 M) 503-502-2726  
 Add me to your contact list!

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# Oregon

Kate Brown, Governor

## Department of Environmental Quality

Northwest Region

700 NE Multnomah Street, Suite 600

Portland, OR 97232

(503) 229-5263

FAX (503) 229-6945

TTY 711

February 14, 2017

Stan Jones  
Port of Portland  
PO Box 3529  
Portland, OR 97208

Re: Next Steps  
Portland Airport Fire Training Pits  
ECSI # 3324

Mr. Jones:

Thank you for signing and returning DEQ's Voluntary Cleanup Letter Agreement for additional investigation and/or cleanup activities associated with the Portland Airport Fire Training Pits. As requested, DEQ will waive the standard \$5,000 deposit that is normally required under new agreements, and will begin tracking our site-related oversight costs and invoicing the Port on a monthly basis.

With the agreement in place, DEQ would like to move forward with the following:

- 1) Reconnaissance sampling of wells in the vicinity of the so-called Original and Former Fire Training Pits, located in the northwest PIA property. This work should include contaminant sampling and collection of groundwater elevation data, the latter to support gradient mapping and evaluation of the potential for groundwater migration within and around local stormwater conveyances. Contaminant testing of groundwater samples should include perfluorinated compounds (and potentially chemical precursors), and petroleum hydrocarbons and hydrocarbon constituent previously detected in wells.
- 2) Complete of a preliminary assessment-level information collection effort to identify:
  - a. The full range of materials historically used as an accelerant or were otherwise burned in the fire training areas. Consider, for example, whether waste oils containing PCBs, halogenated solvents, etc. might have been used.
  - b. The time frames under which each type of material was burned.
  - c. The parties that were (historically) engaged in fire training.
  - d. The full range of chemicals/materials historically used for fire-fighting, including AFFF and any precursor foaming agents.
  - e. Site areas where fire-fighting chemicals, including AFFF and earlier chemical formulations, were stored on site and may have been released to the environment.

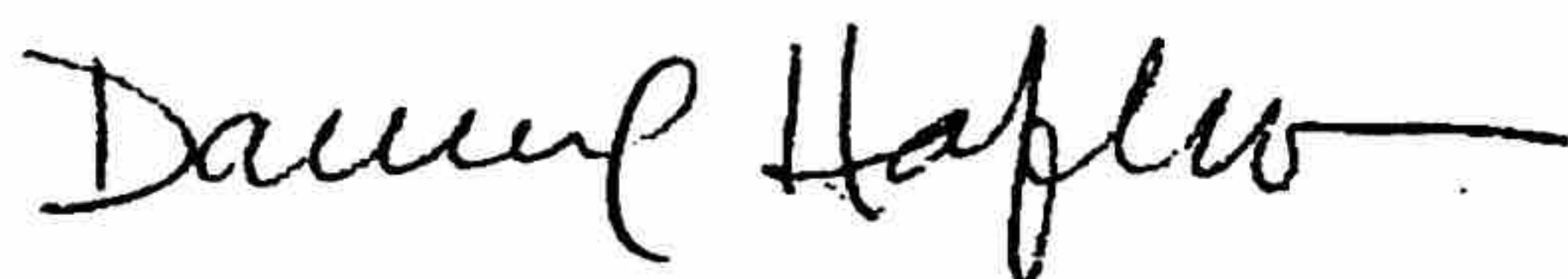


- f. A summarization of the results of investigation and cleanup work completed at the Original and Former fire training areas, and the status of environmental conditions in environmental media as currently known.
- g. The presence of utilities, drainage features, etc. in the vicinity of the fire training areas and might lead to "facilitated" contaminant migration outside of the fire training areas.
- h. Finally, the location (and use) of any other historical fire training areas on the PIA site, including those that may have been operated or used by parties other than the Port of Portland.

In terms of timing, DEQ would like reconnaissance sampling to occur immediately following DEQ approval of a work plan, and can rely on the existing site well network. Please submit a work plan for review and approval within 45 days. In the same general time frame, work should begin on PA-level information collection to document the use of PFAs and other chemical substances for fire training work on the PIA site, and the potential for environmental releases. We expect that this document will be submitted to DEQ in approximately 90 days, after completion of reconnaissance investigation. Information from the combined efforts will inform later investigation and cleanup work, as necessary.

I can be reached at 503-229-5417 if you have any questions.

Sincerely,



Daniel Hafley  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section

cc: ECSI# 3324 File



**HATLEY Dan**

---

**From:** DANIEL J HATLEY  
**Sent:** Wednesday, 4 February 2015 11:22 AM  
**To:** JAMES SHAW; JENNIFER K. KATH  
**Cc:** DR. CLAU AUGER; CHRISTOPHER S. SUTHERLAND; JAMES SHAW; CLAU AUGER; JENNIFER K. KATH  
**Subject:** PHASE 4 FIRE TRAINING PITS - PROPOSED NEW STAGE  
**Attachments:** PROPOSED NEW STAGE - FEBRUARY 2015.pdf

Stan -

Attached is a letter outlining DEQ recommendations for follow up remediation of the historical fire training pits on the Portland International Airport property. Do not hesitate to call or email if you have questions.

Dan Hatley

Daniel J Hatley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ  
(503) 229-5417



**HAFLEY Dan**

---

**From:** St. Clair, Anzie [Anzie.StClair@portofportland.com]  
**Sent:** Friday, February 03, 2017 8:50 AM  
**To:** HAFLEY Dan  
**Cc:** Barthelmess, Suzanne; Jones, Stan  
**Subject:** RE: DRAFT Voluntary Letter Agreement (ECSI #3324)  
**Attachments:** 2014-250 State of Oregon, Department of Environmental Quality - Independ....pdf

Hi Dan,

We noticed a number of changes to the version we sent you. We are ok with most, but would like to talk about the indemnity. The Port (and I believe the State too) always requires that any contractual indemnities are limited to what the Port is allowed to commit to under the Oregon Constitution and the Oregon Tort Claims Act, i.e., that we can't indemnify a another party for damages caused by their own negligent actions. We accept that we would be responsible for our choice to enter DEQ's voluntary cleanup program and the actions the Port takes under that VCP, but would like to be clear that the Port would not be responsible should DEQ staff come on Port property and be injured or injure a third party or property through no fault of the Port. We've agreed to this type of language in the past. See the attached 2014 ICP letter agreement for Troutdale as an example. To avoid trading back another draft, we could write in "To the extent permitted by the Oregon Constitution and by the Oregon Tort Claims Act" immediately preceding the indemnity paragraph and have each party initial the changes. Otherwise, we're happy to have a call to discuss.

Let us know what you think.

Best,

**Anzie St Clair**

Associate General Counsel

Legal Administration

T: 503.415.6279

F: 503.548.5875

C: 503.333.9011

[Anzie.StClair@portofportland.com](mailto:Anzie.StClair@portofportland.com)



---

**From:** HAFLEY Dan [<mailto:dan.hafley@state.or.us>]  
**Sent:** Friday, January 20, 2017 9:21 AM  
**To:** Jones, Stan; HAFLEY Dan ([dan.hafley@state.or.us](mailto:dan.hafley@state.or.us))  
**Cc:** Barthelmess, Suzanne; St. Clair, Anzie  
**Subject:** RE: DRAFT Voluntary Letter Agreement (ECSI #3324)  
**Importance:** High

Stan –

Sorry for the tardy response. Lots going on over here.

The letter looks fine, and your preparation is much appreciated. Please send me a Word version and I will finalize the letter and send over for your signature. I will also confirm the cited reports are available in our files; they presumably



have been archived. If you have electronic versions that you can forward to us, that would be helpful in terms of building the (electronic) administrative file moving forward.

Respectfully,

Dan Hafley

---

**From:** Jones, Stan [<mailto:Stan.Jones@portofportland.com>]  
**Sent:** Wednesday, January 18, 2017 8:08 AM  
**To:** HAFLEY Dan ([dan.hafley@state.or.us](mailto:dan.hafley@state.or.us))  
**Cc:** Barthelmess, Suzanne; St. Clair, Anzie  
**Subject:** DRAFT Voluntary Letter Agreement (ECSI #3324)

Dan,  
Here is the draft VCP agreement for the Fire Training Areas (ECSI #3324). Please look this over and let me know if you have changes or not.

Stan



**HAFLEY Dan**

---

**From:** HAFLEY Dan  
**Sent:** Wednesday, January 25, 2017 11:07 AM  
**To:** 'Jones, Stan'  
**Subject:** Oil Fire Training areas - PIA

Stan –

I have completed review of the three reports you passed on electronically, which give me a good sense of what has gone on with respect to investigation and cleanup activities at the Original and Former fire training pits. DEQ's greatest concerns at the moment are potential impacts to shallow (and potentially deeper) groundwater in the vicinity of these areas, and the potential for preferential migration of soil or groundwater contaminants away from the fire training areas via subsurface utilities. As noted in the reports, the shallow water table appears to be depressed in the vicinity of the 36" RCSP running through the Former Fire Training Pit, and adjacent to the Original Fire Training Pit, suggesting that shallow groundwater is infiltrating the sewer. It is unclear whether infiltration may be occurring in other nearby sewer lines or the storm main (south of the Original Pit) referenced in the 2010 report.

We look forward to the upcoming site visit, and an opportunity to discuss necessary investigation efforts under DEQ to determine whether fire retardant chemicals have impacted site media.

Respectfully,

Daniel J Hafley, RG  
Senior Project Manager/Hydrogeologist  
Northwest Region Cleanup Section  
Oregon DEQ  
(503) 229-5417



**VIA ELECTRONIC MAIL  
AND FIRST CLASS MAIL**

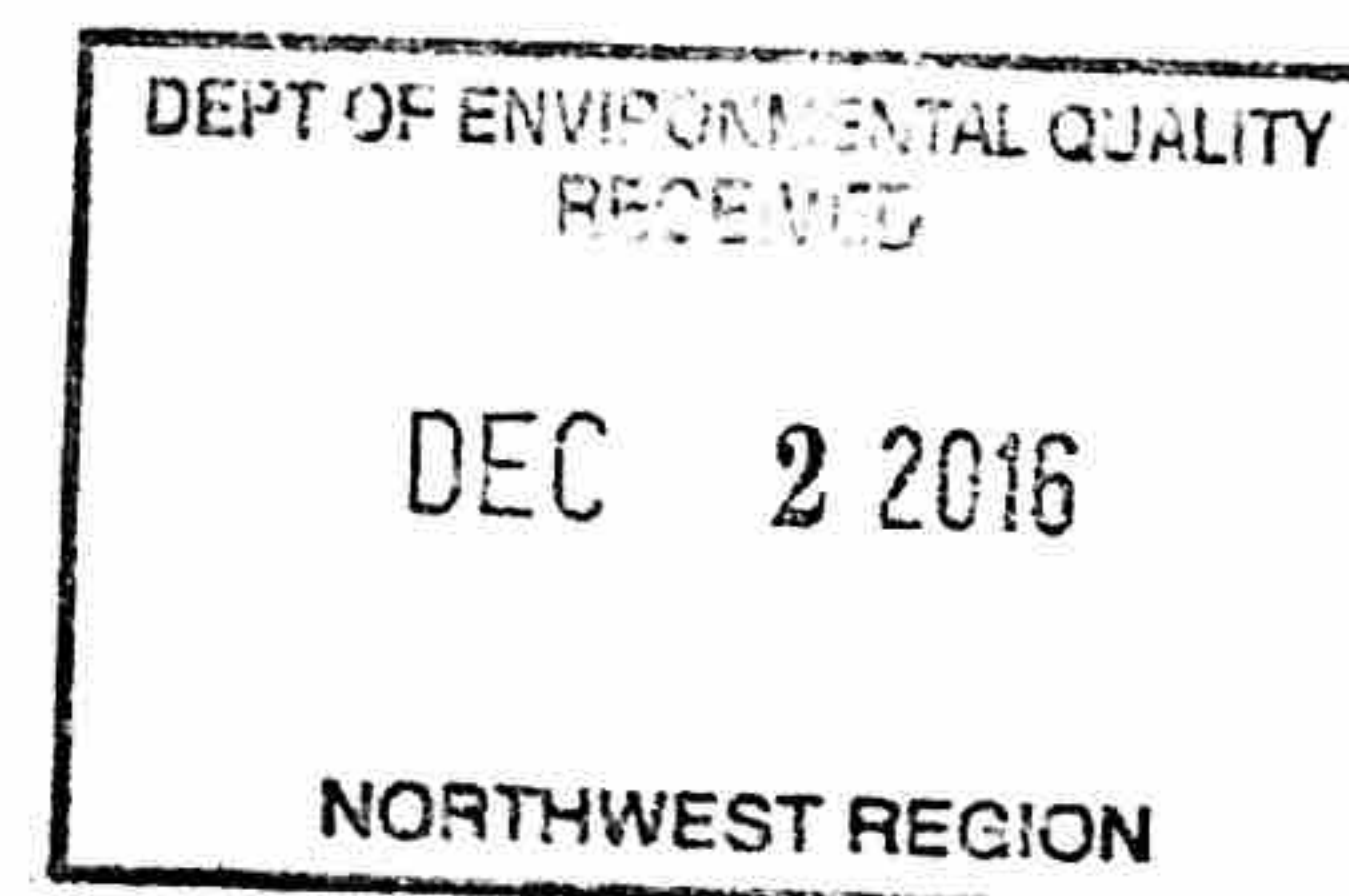
November 30, 2016

Direct Line: (503) 415-6679

Facsimile: (503) 548-5575

Email: [stan.jones@portofportland.com](mailto:stan.jones@portofportland.com)

Dan Hafley  
Oregon Department of Environmental Quality  
Northwest Region Portland Office  
700 NE Multnomah Street, Suite 600  
Portland, OR 97232-4100  
Email: [hafley.dan@deq.state.or.us](mailto:hafley.dan@deq.state.or.us)



**Re: Request for Investigation of Perfluorinated Compounds  
Portland Airport Fire Training Pits  
ECSI #3324**

Dear Mr. Hafley:

In your letter dated September 22, 2016, the Oregon Department of Environmental Quality (DEQ) put the Port on notice of its potential liability for suspected contamination at current and historical fire training areas at PDX and requested that the Port enter the Voluntary Cleanup Program (VCP) with the DEQ to conduct an investigation. On October 21, 2016, the Port requested an extension to DEQ's 30-day response deadline. We appreciate your patience in allowing the Port additional time to reach out to the various stakeholders who benefit from the services of the Portland International Airport Fire Department or the fire training facilities at PDX. This is the Port's response to the September 22 letter.

The Port is willing to perform a remedial investigation (RI), including of PFOS and PFOA, under DEQ's VCP for the historical fire training facilities sites that are described in ECSI No. 3342 under a VCP agreement. ECSI 3342 is immediately adjacent to the Port's active fire training area used by the Port and the Oregon Air National Guard. The Port previously completed investigatory work on the historical facilities in the 1990s to address past releases of petroleum hydrocarbons. The Port provided project files to DEQ in 2002 for review, but the site was not formally closed. The Port anticipates its remedial investigation will build on this prior work.



The Port's main concerns looking forward are related to uncertainties around the risks actually posed by PFOS and PFOA and maintaining our ability to meet FAA fire and life safety standards.

As you are aware, the National Guard Bureau is currently conducting its own investigation of PFOA and PFOS within the confines of the current Portland Air National Guard base, located in the southeast portion of PDX property. We have asked the Portland Air National Guard to participate in this remedial investigation as well.

The Port appreciates the cooperation of the DEQ in this matter and looks forward to working together. I will contact you the week of December 5, 2016, to discuss next steps, including a few necessary modifications to the form of DEQ's letter agreement to adapt it to the Port's circumstances. If you have any questions about this letter, please contact me by email at [stan.jones@portofportland.com](mailto:stan.jones@portofportland.com) or at 503-415-6679.

Sincerely,



Stan Jones, R.G.

cc via email: Phil Ralston, Port of Portland  
Suzanne Barthelmess, Port of Portland  
Cheryl Arpan, Port of Portland  
Anzie St. Clair, Port of Portland  
David Ashton, Port of Portland  
Chris Neal, Port of Portland  
Fire Chief Craig Funk, Port of Portland  
Keith Johnson, DEQ



5504  
COMM  
**HAFLEY Dan**

---

**From:** Jones, Stan [Stan.Jones@portofportland.com]  
**Sent:** Wednesday, November 30, 2016 2:59 PM  
**To:** HAFLEY Dan (dan.hafley@state.or.us)  
**Cc:** St. Clair, Anzie; Barthelmess, Suzanne; Herb Clough (HClough@apexcos.com)  
**Subject:** Port of Portland ECSI #3324 PDX Historical Fire Training Areas  
**Attachments:** 2016-11-30 Port Followup Response DEQ PFC Claim.pdf

Dan,

Attached is the Port's response to your September 26<sup>th</sup> letter. I'll give you a call next week and we can get moving on the VCP agreement.

The Port provided a bunch of files to the DEQ back in 2002 on the site(s) at the time the ECSI number was assigned. Do you still have access to them? Also, I suggest that once we get the VCP agreement in place that you come out for a site tour and a review of the historical data.

Looking forward to working with you on this.

Stan



State of Oregon  
Department of Environmental Quality

Memorandum

Date: November 2, 2016

To: NWR File

From: Daniel Hafley, Hydrogeologist

Subject: Status of Port of Portland Fire Training Pits  
ECSI# 3324

On September 22, 2016 DEQ requested that the Port initiate investigation at the historical fire training pits located on Portland International Airport property to determine whether releases of perfluorinated compounds including PFOS and PFOA have occurred. I visited the Port offices on November 2 to meet with Stan Joes and get an update on the Port's response to DEQ's request. A few notes from the meeting follow.

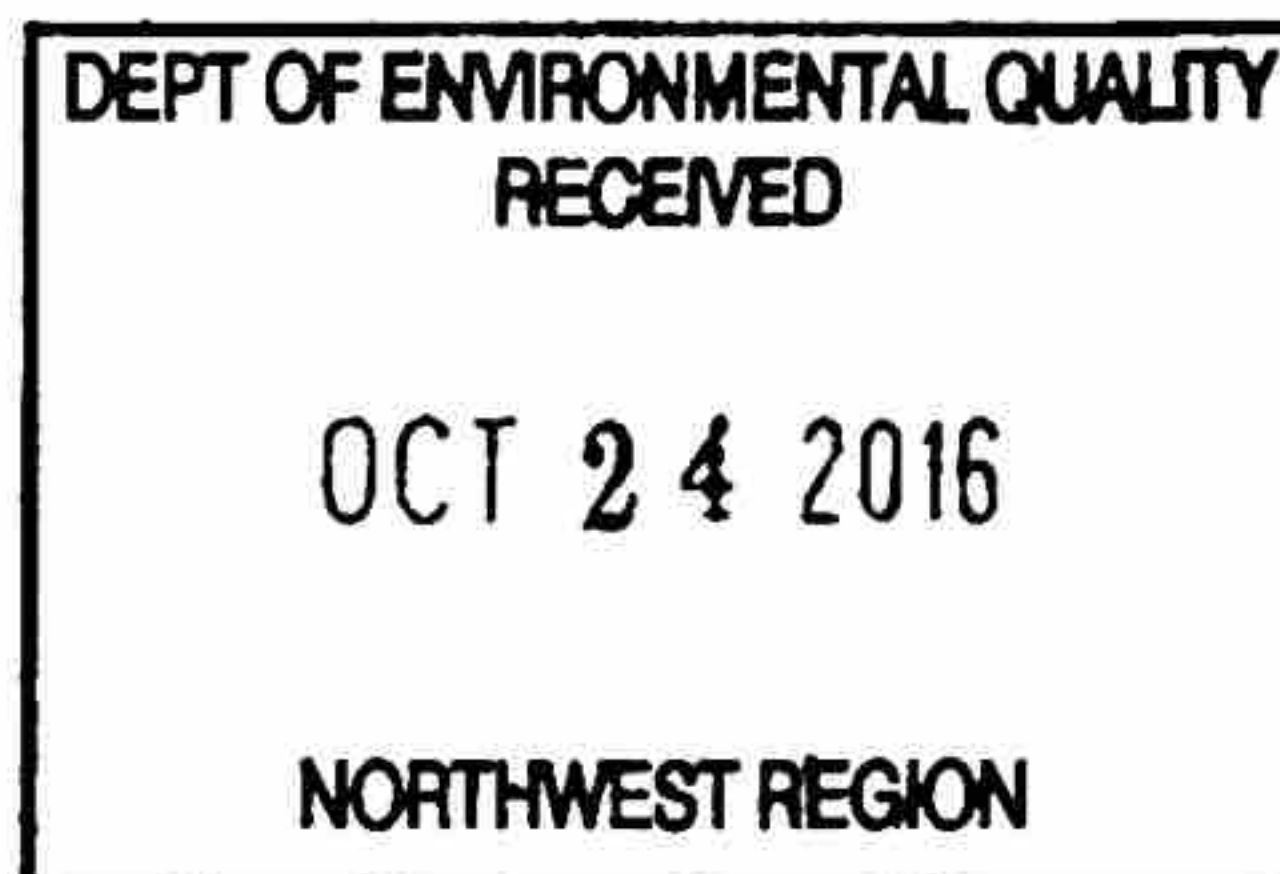
- Mr. Jones walked me through a series of historical and recent photos showing the location of the historical fire training pits (2), located in the northwest portion of the airport, and the nearby location of the current training area.
- An airport-wide preliminary assessment was completed in the late 1980s, which has information on the fire training activities. There was some work with DEQ Cleanup in the late 1990s and early 2000s, however the Port ultimately decided to "go their own way" and completed investigation and some cleanup work independent of the agency (see below).
- In historic fire training, plane mock-ups or the like were lit on fire, and subsequently extinguished using fire-fighting foam. In "the old days", blood may have been used for some training given its capacity to foam when heated.
- The historical pits have been capped by the Port/contractors independent of DEQ, with groundwater monitoring having continued well after capping. The caps apparently consist of a geotextile with overlying gravel.
- The current training area has a liner and liquid capture system, with apparently some reuse of material.
- There are a number of monitoring wells located in the vicinity of the historical and current fire training areas, with a robust data set having been developed for petroleum contaminants (used in training exercises) including BTEX and PAHs. Mr. Jones indicated that some free product was present at at least one of the historical pits in the past.
- The Port has engaged their insurers regarding historical releases, and will be contacting DEQ soon regarding entering the VCP to investigate perfluorinated compounds as requested by the agency. They will likely want to complete work under a consent order. Work on the order could start in late 2016, and will include a scope and schedule for site work.



- DEQ indicated that their two prime concerns with the pits are: 1) groundwater impacts, and the potential for groundwater-to-surface water migration of contaminants (to nearby Columbia River); and 2) potential releases to nearby surface water via overland flow or leaky storm drains. Historically, discharge may have occurred to Elrod Ditch located to the south of PIA. More recently stormwater discharge from the pit areas appears to have been directed through a series of pipes and ditches ultimately discharging to McBride Slough. The MCDD is apparently planning to dredge contaminated sediment from Elrod Ditch sometime in the near future, while investigation and cleanup actions in McBride Slough are being overseen by DEQ.
- In addition to the two historical pits mentioned above, there are additional locations on the airport property where fire training occurred, either by the Port or Air National Guard personnel. Depending on the results from the two main pit locations, it may be necessary to expand investigation to additional areas.



Mission: To enhance the region's economy and quality of life by providing efficient cargo and air passenger access to national and global markets.



October 21, 2016

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Dan Hafley  
Oregon Department of Environmental Quality  
Northwest Region Portland Office  
700 NE Multnomah Street, Suite 600  
Portland, OR 97232-4100

**Re: Request for Investigation of Perfluorinated Compounds  
Portland Airport Fire Training Pits  
ECSI #3324**

Dear Mr. Hafley:

The Port of Portland (Port) received the Oregon Department of Environmental Quality's (DEQ) claim letter dated September 22, 2016, putting the Port on notice of its potential liability for suspected contamination at current and historic fire training areas at PDX and requesting that the Port enter the Voluntary Cleanup Program with the DEQ to conduct an investigation.

The Port is evaluating this matter and intends to work with the DEQ to achieve a timely resolution. There are, however, other stakeholders in this matter including PDX tenants, the airlines, other users of PDX fire training areas, and Port insurers. We are having active discussions with those stakeholders and would like to have the opportunity to educate and coordinate our response with them. We are also in the process of retaining outside counsel on this matter. For these reasons, the Port requests an extension of DEQ's 30-day response deadline set out in its letter. By November 30, 2016, the Port will update you on our investigation of the claim and provide our preliminary response.

7200 NE Airport Way Portland OR 97218  
Box 3529 Portland OR 97208  
503 415 6000



Dan Hafley  
October 21, 2016  
Page 2

The Port appreciates the cooperation of the DEQ in this matter and looks forward to working together. If you have any questions about this letter, please contact me by email at [stan.jones@portofportland.com](mailto:stan.jones@portofportland.com) or at 503-415-6679.

Sincerely,

A handwritten signature in black ink, appearing to be 'Stan Jones', written over a faint rectangular stamp.

Stan Jones, R.G.

cc: Phil Ralston, Port of Portland  
Suzanne Barthelmess, Port of Portland  
Cheryl Arpan, Port of Portland  
Anzie St. Clair, Port of Portland  
David Ashton, Port of Portland  
Keith Johnson, DEQ